Collaborative Environmental Policies for the Dairy Industry

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John Shenot
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Acronyms and Abbreviations

ADAS	Agricultural Development and Advisory Service
AFS	Assured Food Standards
AONB	Area of Outstanding Natural Beauty
BASIS	British Agrochemical Standards Inspection Scheme
BBC	British Broadcasting Corporation
BETA	Biodiversity and Environmental Training for Advisers
BFS	British Farm Standards
CAFO	Confined Animal Feeding Operation(s)
CAP	Common Agricultural Policy
CD	Compact Disk
CPA	Crop Protection Association
DATCP	Wisconsin Department of Agriculture, Trade and Consumer Protection
Defra	Department for Environment, Food and Rural Affairs
DEPC	Welsh Assembly Government's Department for Environment, Planning & Countryside
EHSNI	Environment and Health Service of Northern Ireland
ELS	Entry Level Stewardship scheme
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System(s)
EMSF	Environmental Management System for Farms
EQM	Environmental Quality Mark
ERAD	Scottish Executive's Environment and Rural Affairs Department
ERDP	England Rural Development Program
EU	European Union
FACTS	Fertilizer Advisers Certification and Training Scheme
FWAG	Farming and Wildlife Advisory Group
GAEC	Good Agricultural and Environmental Condition
ha	Hectare(s)
HLS	Higher Level Stewardship scheme
IFM	Integrated Farm Management
IGER	Institute of Grassland and Environmental Research
IPPC	Integrated Pollution Prevention and Control
IRAP	Integrated Regulation of Agriculture Project
ISD	Integrated Site Database
ISO 14001	International Organisation for Standardisation's standard for environmental management systems
LEAF	Linking Environment And Farming
MAFF	Ministry of Agriculture, Fisheries and Food
MDC	Milk Development Council
mg/l	Milligram(s) per liter
mm	Millimeter(s)
NDFAS	National Dairy Farm Assured Scheme
NFU	National Farmers Union
NVZ	Nitrate Vulnerable Zone(s)
OAS	Organic Aid Scheme
OELS	Organic Entry Level Stewardship scheme
OFS	Organic Farming Scheme
OPRA	Operator and Pollution Risk Appraisal

PLANET	Planning Land Application of Nutrients for Efficiency and Environment
ppl	Pence Per Liter
RCRA	Resource Conservation and Recovery Act
RDS	Rural Development Service
RSPB	Royal Society for the Protection of Birds
SEPA	Scottish Environment Protection Agency
SFP	Single Farm Payment
SMR	Statutory Management Requirement(s)
SPS	Single Payment Scheme
SSAFO	Silage, Slurry and Agricultural Fuel Oil
UK	United Kingdom
US	United States
USEPA	United States Environmental Protection Agency
VI	Voluntary Initiative (for Pesticides)
WDNR	Wisconsin Department of Natural Resources
WFA	Whole Farm Appraisal
WFD	Water Framework Directive

Executive Summary

This report summarizes the findings from research I conducted as an Atlantic Fellow in Public Policy from September 2004 through June 2005. The subject of my research was Collaborative Environmental Policies for the Dairy Industry. I studied how voluntary and collaborative approaches are used in the UK to supplement "command and control" regulation of dairy farms, and examined the potential to expand the use of such approaches through my permanent position with the Wisconsin Department of Natural Resources. My host in the UK was the Environment Agency, the lead environmental regulatory body for England and Wales.

The dairy sector in England and Wales consists of over 15,000 farms and 1.6 million cows. The numbers for Wisconsin are very similar. In both localities, the dairy sector supports more jobs and adds more money to the economy than any other form of agriculture. Also, the number of farms in both places decreases each year and the average size increases. The biggest difference between Wisconsin and the UK is that a majority of Wisconsin dairy cows are housed and fed indoors all year round, while almost all UK dairy farms put their cows out to graze for about half the year. Despite this difference in farming systems, the environmental issues are essentially the same but with different areas of emphasis. Whether a feedlot or a grazing system is used, dairy farming can potentially have a significant impact on surface and groundwater quality and quantity, land quality (especially through soil compaction and erosion), air quality and climate change, resource consumption, waste management, land use, and biodiversity. The economic impacts of dairy farming are but a small part of the US and UK national economies, but are extremely important in certain regions of England and Wales and large parts of Wisconsin. Dairy farming tends to be a central part of the social fabric of those regions as well.

One must understand how dairy farms are regulated in order to fully understand the alternatives to direct regulation. The UK regulatory regime is not altogether different from the US but some of the differences merit detailed discussion. Air quality issues, for example, do not appear to garner the same regulatory attention in the UK as they do in the US. Most of the regulations applicable to UK dairy farms concern water: direct discharges to water, runoff prevention, special rules for nitrates, groundwater protection, and extraction or impoundment of surface waters. In addition, farms are soon to be subject to waste management regulations for the first time. But perhaps the most profound regulatory program lies in the future, with something called the Water Framework Directive. This directive requires all UK waters to be in "good ecological condition" by 2015, and further regulations will be developed if necessary to attain that status. The Environment Agency is launching an initiative called the Integrated Regulation of Agriculture Project to coordinate its approach to permits, inspections, compliance monitoring, data collection, and environmental fees.

This report summarizes a wide variety of policy initiatives that serve as *alternatives* to direct regulation. I present these alternatives in four separate categories.

- Education and Advice –There are many institutions offering classroom education and degree programs for farmers. Some of these programs include environmental subjects as an important part of the curriculum. The UK approach in this respect is not radically different from what happens in the US. There are also many

opportunities for continuing professional development, including some programs that specifically address the environmental aspects of fertilizer and pesticide use. Governments, universities, and other institutions provide a wealth of information to farmers via publications, websites and software. Perhaps the most interesting twist on this simple subject is the use of published Codes of Good Agricultural Practice. Though the codes are voluntary, a farmer that adheres to the codes is more likely to be judged by a court to have practiced due diligence in the event of a pollution incident. Concerning on-farm advice, the most significant difference between the UK approach and the US approach is that UK environmental organizations have a central role and they collaborate with farmers and farming organizations. Demonstration farms are also a key part of education and advice policies, with government (and other organizations) actively supporting the demonstration of environmental best practices on working farms (as opposed to research farms).

- Economic Incentives and Disincentives – In 2003 the Common Agricultural Policy of the European Union was radically reformed. The reforms, which began to take effect in the UK in 2005, have led to a new Single Payment Scheme and a variety of agri-environment schemes. The net effect of these programs is a gradual transition in the UK away from production-base subsidies for farmers, toward government payments based on environmental performance and stewardship. A tiered approach is employed. Farmers who wish to qualify for the Single Payment Scheme (i.e., qualify for government subsidies) must maintain their farms in "Good Agricultural and Environmental Condition." Under the agri-environment schemes, farmers who do a little extra for the environment can qualify for a little extra money, and in some cases farmers can qualify for much larger payments by making more substantial environmental improvements. In addition, the UK has for several years subsidized the transition of farms from conventional to organic production techniques as part of a broader program for sustainable rural development.

- Environmental Management Systems (EMS) – The Environment Agency has not put much emphasis on encouraging EMS implementation by farmers, and as a result there are virtually no dairy farms in England or Wales with an EMS. Most of the effort has instead focused on building a computer-based EMS for Farms tool that is intended to help farmers develop an EMS, identify best practices, and file regulatory reports. Greater progress has been made elsewhere in the supply chain with milk and cheese processors. Most dairy processors have already implemented a certified EMS or have a plan to do so. One of the motivating factors for these businesses is that a certified EMS can potentially simplify their interactions with the Environment Agency and reduce the fees they pay. There is currently no similar incentive for dairy farms.

- Negotiated or Voluntary Agreements – As part of its sector-based approach to regulation, the Environment Agency has been negotiating with agricultural stakeholders on the development of an Environmental Plan for the Dairy Sector. This sector plan is intended as a vehicle for bringing stakeholders together and encouraging them to agree on a short list of mutual priorities, collaborative action items, and joint communications strategies. The Pesticides Voluntary Initiative, by contrast, is an *industry-led* voluntary effort to reduce the environmental impacts of

pesticide use. This initiative began when the government proposed a stiff tax on pesticide sales, and the industry offered a suite of voluntary actions as an alternative to the tax. Assurance schemes, environmental labels, and brands can also serve as de facto voluntary agreements. For example, roughly 85% of milk produced in the UK qualifies for the National Dairy Farm Assured Scheme and is marketed to consumers with a well-recognized *logo* seen on many different brands of milk. This scheme is not specifically an environmental program but it does require farmers to take several environmental measures beyond what regulations demand. Wet and Wild Milk is an example of a environmental *brand* that costs a little bit extra but promises consumers that the premium they pay goes directly toward environmental protection.

Based on all of my observations, I have concluded that it is reasonable to think we can derive some good ideas from UK policies and adapt those ideas for use in the US. This applies to direct regulation policies as well as the alternatives. What is important is that we make policy choices based not only on what works well in the UK, but also based on an understanding of the similarities and differences between the UK and US context for policy development.

The UK approach to environmental protection generally emphasizes four strategies that are not featured as prominently in the US. First among these strategies is a genuine willingness to use both incentives and disincentives (or carrots and sticks) to get environmental improvement. The second strategy is to use risk-based approaches to guide the development and implementation of every aspect of environmental policy. Third, UK regulators strive for an integrated cross-media approach, as opposed to disjointed regulation of water, land, air, waste, and biodiversity issues. Finally, UK policymakers seek to tackle the most pressing environmental challenges through combinations of multiple policy instruments, rather than searching for perfect solutions. All four of these strategies are certainly an important part of US environmental policy, but in all four cases the Environment Agency has a more focused and consistent strategic approach than is commonly found in the US.

Turning toward UK policies specifically for promoting sustainable agriculture, there are six tactics that I found to be particularly noteworthy. First, the UK benefits somewhat from a merging of the bureaucracies responsible for agricultural and environmental policy. Second, those government institutions and UK environmental advocacy groups place a high priority on sustainable agriculture. Third, these organizations take a holistic view to environmental challenges and seek solutions that address multiple issues simultaneously. Fourth, the Environment Agency tries to hire staff with real agricultural experience, then encourages and enables them to enhance their knowledge of agricultural issues as well as regulations and environmental subjects. The fifth tactic is collaboration, and this refers not just to collaboration between regulators and farmers but more surprisingly to the extensive collaboration between farmers and environmentalists. The last noteworthy tactic is the way in which the UK, and indeed most of Europe, is beginning to invest in “natural capital” by paying farmers not for their production of market commodities but instead for their service as stewards of land and water.

I conclude the report with a list of ten policy recommendations for consideration in Wisconsin and/or the US, and five recommendations for UK policymakers.

Recommendations for Wisconsin:

1. use risk-based approaches backed by evidence;
2. attach value to natural capital and get away from market interventions;
3. continue/strengthen tiered approaches to performance and rewards;
4. emphasize the value of local food production and local solutions to environmental problems;
5. develop sector plans and pilot test the idea of a watershed plan;
6. solve problems using multiple instruments and multiple institutions;
7. integrate efforts within and across departments;
8. continue emphasizing collaboration;
9. adopt/maintain a coordinated approach to environmental advice for farmers; and,
10. target outreach to contractors.

Recommendations for the UK:

1. invest the resources necessary to finish the dairy sector plan;
2. beware turf battles;
3. start thinking now about how to ensure large dairy CAFOs will be sustainable;
4. embrace climate change as an opportunity for farm businesses to diversify; and,
5. address the problem of supermarket power.

1.0 Overview

This chapter provides an introduction and overview to the dairy sector of the United Kingdom by examining the role of government and considering the three aspects of sustainable development: environment, economy, and society.

1.1 Governance and Institutional Roles

The United Kingdom (UK) consists of Great Britain (England, Scotland, and Wales) and Northern Ireland. The UK is governed by a democratically elected Parliament whose members come from all four nations. The UK Parliament has devolved much of its authority over domestic policy to the Scottish Parliament and the National Assembly of Wales, which are also democratically elected bodies representing only those specific nations. Devolution of authority to a Northern Ireland Assembly was initiated but has been suspended because of the security situation there. England does not have its own parliament but rather is governed solely by the UK Parliament.

The Department for Environment, Food and Rural Affairs (Defra) is the UK cabinet-level entity with primary responsibility for both environmental issues and agricultural issues. Defra speaks on behalf of the entire UK on international policy issues, most notably at the European Union (EU) level, and also leads policy development for England. Defra's counterparts in Scotland and Wales are the Scottish Executive's Environment and Rural Affairs Department (ERAD) and the Welsh Assembly Government's Department for Environment, Planning & Countryside (DEPC). In each instance, the placement of agriculture and environment within a single department has profound implications for public policy. While the organizational structure does not by itself guarantee that all agricultural issues will be viewed in the light of environmental protection, it does greatly increase the likelihood that sustainable development will be pursued.

The *implementation* of environmental policy needs to be delivered in a way that is perceived to be fair, objective, and free from undue political influence. For this reason, the departments mentioned above (Defra, ERAD, and DEPC) have all delegated environmental protection and pollution control duties to separate, independent public bodies. In Scotland, ERAD sponsors and funds the Scottish Environment Protection Agency (SEPA). Defra sponsors and funds the Environment and Health Service of Northern Ireland (EHSNI). And finally, the Environment Agency assumes these duties in both England and Wales and is sponsored and funded by both Defra and DEPC.[1] The nature of the authority delegated to each of these regulatory bodies is described in a written concordat.

The Environment Agency[2] is governed by an independent board, which is ultimately accountable for the Agency's organization and performance. Board members are

[1] These departments delegate responsibility to several public bodies, not just the environmental authorities listed above. One example is English Nature, which has authority in England for most biodiversity issues. This division of pollution issues and biodiversity issues into separate public bodies is common in the United States as well, but in Wisconsin a single body (the Department of Natural Resources) oversees both subjects.

[2] This report will focus primarily, and at times almost exclusively, on England and Wales. The reason for this focus is purely practical as the author has been hosted and sponsored by the Environment

appointed by the Secretary of State for Defra, except for one board member who is appointed by the Welsh Minister for DEPC. The Agency is led by a Chief Executive who is hired by the board on merit through open recruitment.

1.1.1 Regulatory Approach of the Environment Agency

The Environment Agency aims to get the right balance between:

- providing risk-based, outcome-focused, cost-effective regulation to protect the environment and human health;
- not imposing unnecessary administrative burdens on regulated businesses; and,
- ensuring the public retains confidence in the Agency as an effective regulator and guardian of the environment.

The Agency's *Vision for the Environment and a Sustainable Future*[3] centers on nine themes:

- a better quality of life;
- an enhanced environment for wildlife;
- cleaner air for everyone;
- improved and protected inland and coastal waters;
- restored, protected land with healthier soils;
- a greener business world;
- wiser, sustainable use of natural resources;
- limiting and adapting to climate change; and,
- reducing flood risk.

The Agency strives to use the flexibility allowed by the legislative framework to achieve the desired balance and deliver the required environmental objectives in the most efficient and effective manner.

With respect to agriculture in general and dairy farming in particular, Environment Agency staff believe that the normal regulatory model is imperfect, at best. As will be explained below, it's thought that agricultural markets are sufficiently distorted that a traditional "polluter pays" approach would probably entail an impossible economic burden in many cases. Furthermore, Environment Agency staff recognize the impracticality of trying to regulate more than 150,000 farms with the same rigor that they regulate industrial sites.

1.1.2 Influence of the European Union

By all accounts, about 80% of recent environmental requirements in the UK originated with EU directives. The strategy employed by the UK has been to influence

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Agency, which has no authority in Scotland or Northern Ireland. Significant policy differences *known to the author* will be noted, but undoubtedly many statistical details and subtle policy differences will be overlooked. This report should not be read as a comprehensive review of policy for Scotland or Northern Ireland.

[3] "*Our Vision*"; Environment Agency, undated. Available for download from the Internet at http://www.environment-agency.gov.uk/commondata/acrobat/vision.pdf.

European directives in ways that make the most sense for the UK. For agricultural and environmental issues, Defra take the lead on EU negotiations but the regulatory bodies are frequently consulted for their expertise in implementation, especially concerning compliance and enforcement policy issues. Once they are final, EU directives are translated into legislation in the UK. (In many cases, separate legislation is created for England, Scotland, Wales and Northern Ireland.)

Legislation originating in Europe is not always viewed favorably in the UK, but it is implemented nevertheless because to do otherwise would invite stiff financial penalties from the EU. This aspect of the relationship is similar in many ways to the relationship between most states and the United States (US) Environmental Protection Agency (USEPA).

1.2 Composition of the Dairy Sector

The Dairy Sector in England and Wales currently comprises around 15,000 producers, who manage 150,000 square kilometres of land and milk 1.6 million cows.[4] Milk production accounts for at least 11% of the United Kingdom's total agricultural output. Dairy farming, together with other industries that depend on it, is an important economic feature in many parts of the countryside.

The 15,000 dairy farms are located throughout England and Wales but are not evenly distributed. The concentration of dairy farms is much higher in the wetter western side of the country and comparatively lower in the east. The trend towards milk production moving west and north reflects the comparative advantages those areas have in terms of producing milk efficiently from grass. However, liquid milk tends to be processed close to its end market, so there are dairy farms near all major urban areas.

Until the mid 1990s, all milk produced in England and Wales was bought and sold by one statutory Milk Marketing Board. Dairy farm incomes initially rose following the break-up of this Milk Marketing Board in 1994, but have plummeted since then. As a result, there has been extensive restructuring at farm level in England and Wales, which has seen the number of farms almost halve in ten years and drop nearly 7% in just the last year. It is estimated that the restructuring process will continue following the recent reform of the Common Agricultural Policy (CAP) of the EU, which will reduce support prices and facilitate restructuring through major changes to support payments (see below). A research report commissioned by the Dairy Supply Chain Forum predicts that by 2015 producer number may shrink to somewhere between 10,700 and 14,700 farms.[5] Yet despite the reduction in farm numbers, milk production across England and Wales has not declined significantly. This reflects the fact that for many dairy farmers, the route to improved efficiency in order to cope with a competitive market climate is to get bigger in order to spread costs over a larger turnover.

[4] Most current available data as of May 2005. Values rounded off to two significant digits. Number of producers and cows from Milk Development Council Datum, available on the Internet at http://www.mdcdatum.org.uk/farmdata/farmdata.htm.

[5] "*The Future of UK Dairy Farming*"; Colman and Harvey, 2004. Available on the Internet at http://www.defra.gov.uk/foodrin/milk/colman-harveyreport.pdf.

This trend towards increased scale of milk production has seen average herd sizes increase from 76 across England and Wales in 1996 to 94 in 2003 and also an increase in average milk yields from 5,397 liters per cow in 1995 to 6,634 in 2003. Whilst farm size has also expanded, this has not happened to the same degree. Production has therefore tended to intensify on most units.

Expansion plans undertaken by farmers have necessitated significant infrastructure changes to accommodate increased cow numbers and to make most efficient use of labor. It is widely felt that the capacity of dairy farms to manage slurry, manure and other sources of diffuse pollution on dairy farms has not kept pace with increased milk production.

As the following table indicates, Wisconsin is similar in many relevant ways to England and Wales.[6] All data are for 2004 unless otherwise specified. The most noticeable difference is in population density, which is nines times greater in England and Wales. This difference has environmental and social implications for dairy farming, as will be explained later in this report.

	Wisconsin	England & Wales	United Kingdom
Land Area (ha)	14.1 million	15.1 million	24.3 million
Population	5.5 million	52.8 million (mid 2003)	59.6 million (mid 2003)
Farmland (ha)	6.3 million (2003)	10.6 million (2003)	18.4 million
# Farms	76,500 (2003)	224,400 (2003)	304,800 (2003)
Average Farm Size (ha)	83 (2003)	47 (2003)	57 (2003)
# Dairy Farms	15,900	15,200	26,600 (2003)
# Milk Cows	1.2 million	1.6 million	2.1 million
Mean Herd Size	78 cows	108 cows	82 cows (2003)
Milk Production (liters)	9.7 billion	11.0 billion	14.0 billion

1.3 Activities

The common on-farm activities of dairy producers that directly or indirectly lead to environmental impacts include:

- managing grazing pastures and croplands;
- housing, feeding, and caring for dairy cows;
- handling and storing silage, silage effluent, manure, and slurry;
- spreading manure and slurry on fields;
- using plant protection products;
- operating farm machinery; and,
- managing and disposing of solid non-natural wastes.

[6] Data have been collated from a variety of government statistical sources and are presented for illustrative purposes only. The author acknowledges that differences in terms and data collection procedures make comparisons problematic.

In the UK the vast majority of dairy cows are turned out to pasture for 7 or 8 months per year. Grazing is much less prevalent in Wisconsin, where more than half of all dairy farms use yearlong confinement systems.[7] And even though winter days in Wisconsin last longer than they do in the UK, the harsh temperatures, ice, and snow prevent grass growth and make grazing difficult or impossible for at least 5 months of each year.

1.4 Environmental Aspects and Impacts

Agriculture's important role in protecting the wider rural environment, given that the countryside consists almost entirely of working agricultural land, is becoming increasingly recognized. Farmland is the key to biodiversity, open spaces, picturesque landscapes, and many forms of tourism that come with those attributes.

Dairy farming plays a pivotal role in some of the UK's most pressing environmental issues. This is true in Wisconsin as well. Interestingly, this sector's role has both negative and positive aspects. The most significant aspects are summarized below.

1.4.1 Water Quality

Agricultural runoff (diffuse pollution) is widely considered to be the most significant unaddressed (or inadequately addressed) threat to water quality in both the US and the UK. And compared to most other forms of agriculture, dairy farming poses unusually high risks. When inorganic fertilizers or slurry are applied to land at inappropriate times or in excessive quantities, nitrates and phosphates can leach through the soil into groundwater or run off into surface waters. The same is true for pesticides. In addition to the direct ecological impacts of these pollutants, the costs of treating drinking water to remove unhealthy contaminants (especially nitrates) are substantial.[8] Diffuse pollution, however, is not the only concern. Considering all the potential sources of agricultural pollution, milk, silage effluent and slurry are three of the most harmful substances in terms of biochemical oxygen demand. Spills and seepage of large quantities of these substances to surface water are a notorious cause of fish kills. Dairy farms have been responsible for roughly half of all agricultural pollution incidents (i.e., spills) in England and Wales in recent years.[9]

Appropriate storage and handling of manure and slurry can reduce the risk of water pollution. Responsible use of pesticides can also have water quality benefits. Some pasture and cropland management practices can buffer surface waters against contamination from runoff. Careful regulation of the diet of dairy cows can reduce the levels of nitrates and phosphates in their excreta, while ensuring animal health and productivity.

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[7] A survey found that 23 percent of Wisconsin dairy farmers reported using management intensive rotational grazing systems, 21 percent used pastures non-intensively, and 56 percent used full confinement systems. "*Wisconsin Family Farm Facts, No. 9*"; Program on Agricultural Technology Studies, University of Wisconsin-Madison and University of Wisconsin-Cooperative Extension, February 2000.

[8] The annual cost to the UK water industry of removing nitrate pollution from agriculture has been estimated at £16.4 million. "*An assessment of the total external costs of UK agriculture*"; Pretty, J. N. et al., Agricultural Systems 65: 113-126, 2000.

[9] Pig and poultry operations may pose even greater risks, due to their intensive nature, but those sectors are now tightly regulated under the Integrated Pollution Prevention and Control regulations.

1.4.2 Land Quality

Sustainable farming is impossible unless soil health and productivity are maintained over the long term. In addition, erosion can cause water quality problems and compaction can exacerbate flooding problems. These problems are largely preventable. Farm machinery operations, land spreading practices, and pasture and cropland management are all important factors in prevention. For example, dairy farmers can manage crops in ways that minimize erosion, restrict cropping even further on fields that are highly vulnerable to erosion, or develop and implement comprehensive soil management plans.

1.4.3 Air Quality and Greenhouse Gases

Manure and slurry can generate odor complaints and release ammonia, methane, volatile organic compounds, hydrogen sulfide and other pollutants to the air. Nitrates that are present in heavy soils can be lost to the atmosphere as nitrogen gas or nitrogen oxides if the soils become waterlogged in warm conditions. Farm vehicles emit the typical products of fossil fuel combustion, notably carbon dioxide, nitrogen oxides, fine particulates, and sulfur dioxide. The burning of waste (soon to be illegal in most cases in the UK) emits these same products of combustion, but when the waste includes plastics other more toxic emittants are also likely. Pesticide mists, if inhaled, can also have toxic effects. They can also drift into watercourses.

Air emissions from the dairy sector rarely have a major impact on air quality, but problems could arise in specific unusual situations. Appropriate storage, handling and application of manure and slurry can minimize odors and air emissions, while responsible use of pesticides can reduce or eliminate inhalation risks.

Agriculture was also responsible for more than 7% of the UK's greenhouse gas emissions in 2002[10] and 8% of US emissions in 1998.[11] This may be a more significant issue. Dairy farms are a significant contributor to those percentages, primarily due to methane emissions from animals and slurry stores. Methane has 32 times the warming potential of the most plentiful greenhouse gas, carbon dioxide.

A wide range of management options exists for minimizing on-farm energy consumption, which can reduce greenhouse gas emissions. More importantly, livestock methane emissions can be and in fact have been reduced through dietary modifications, while ensuring animal health and productivity are maintained. Finally, pastures can effectively sequester greenhouse gases and farms can be excellent sites for renewable energy projects. In particular, the opportunities for anaerobic digesters are increasingly promising, and dairy farms could play an important role in helping the UK meet its climate change challenges, commitments, and goals.

1.4.4 Consumption of Natural Resources

[10] "*Environmental Accounts*"; a National Statistics publication, Autumn 2004. Available at http://www.statistics.gov.uk/downloads/theme_environment/EANov04.pdf.
[11] "*Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1998*"; USEPA, EPA 236-R-00-001, April 2000.

Directly or indirectly, dairy farms often consume significant quantities of natural resources through their use of water, electricity, fuels for farm vehicles and equipment, pesticides, and inorganic fertilizers. A wide range of management options exists for minimizing or eliminating some of these inputs.

1.4.5 Recycling and Waste Management

Dairy farms produce significant quantities of solid non-natural waste, such as pesticide containers, silage wrap and other plastics, tires, batteries, and oil. Although these materials constitute only a tiny fraction of the total volume of waste generated in England and Wales, they are significant because most are currently burned, buried, or dumped somewhere on the farm where they are generated. New regulations are expected by autumn 2005 that will make most of these disposal practices illegal, as they have been for decades in nearly all other business sectors. It should also be noted that some dairy farms obtain waste exemptions so industrial wastes can be spread on their land for agricultural benefit. In this manner the dairy sector helps other sectors reduce the need to dispose of those materials in landfills.

Dairy farmers that minimize purchased inputs such as pesticides and inorganic fertilizers will reduce the amount of packaging waste that they need to manage and potentially reduce costs.

1.4.6 Land Use, Habitats and Biodiversity

The impact of dairy farms on biodiversity is an important issue in Wisconsin, but even more so in the UK. In this densely populated country where three-fourths of all land use is agricultural, dairy farms provide invaluable habitats for wildlife, especially when compared to industrial and urban land uses. In addition to pastures and cropland, dairy farms often encompass forestland and riparian corridors. Numerous species of mammals, fish, butterflies, and birds are largely dependent on UK dairy farms. Unfortunately, some farming practices that were adopted before biodiversity issues were widely appreciated have contributed to a decline in a range of species. For example, research suggests there has been a 40 per cent decline in bird abundance on farms between 1970 and 2003.[12] Recognition of environmental issues, however, has led to changes in farm management that have benefited wildlife, and continue to hold enormous potential for habitat and biodiversity improvements in the future.

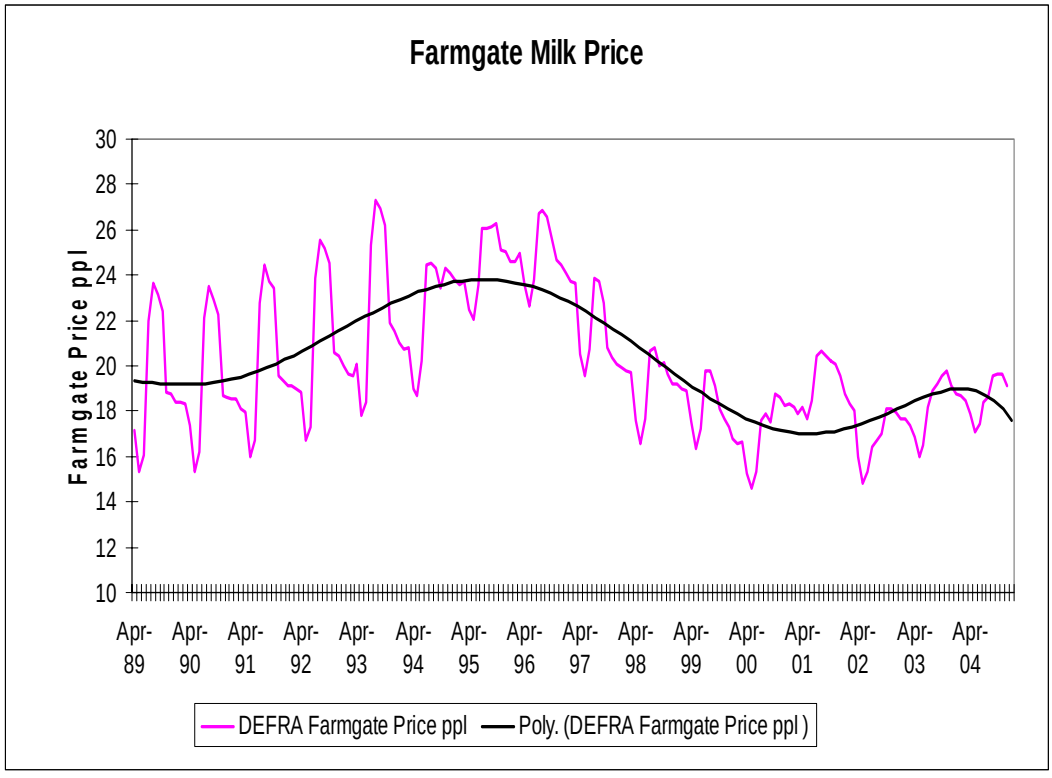
Declines in UK birds that are considered to be farmland specialists, for example lapwings and corn buntings, have been more pronounced than the impact seen on generalist species. This is likely due to three factors - the loss of nesting sites, the lack of seed food, and the lack of insect food - that often result from agricultural improvements to grassland. On-going research in the UK is hoping to identify ‘tweaks’ in existing dairying techniques that will significantly benefit both farmland birds and wildlife in general.

1.5 Economic Considerations

[12] “*Achieving a better quality of life - Review of progress towards sustainable development: Government annual report 2003*”; Defra, March 2004. Available on the Internet at http://www.sustainable-development.gov.uk/documents/publications/ar2003.pdf.

The dairy sector is the economic leader within the agricultural industries, but according to government statistics[13] agriculture of *all* types accounted for less than 1% of the total UK economy in 2003 and less than 2% of total employment. It's critically important, however, to remember that in most rural areas the importance of agriculture greatly exceeds those national figures. For example, agricultural employment in many counties of Wales creates about 10% of all jobs. Milk production has a strong economic multiplier effect, too. Dairy farming is a highly specialized industry that supports a number of ancillary enterprises, ranging from animal feed suppliers to large animal veterinarians. Dairy processing creates additional jobs and adds to rural (and urban) economies. Collectively, these enterprises define the economies and the social character of many rural communities across large areas of the UK. The same is true in Wisconsin.

The viability of dairy farming is largely dependent on the price paid for raw milk. There are several variables that influence the price paid to individual farmers, but according to Defra statistics for the year 2004 the *average* price paid to farmers was just over £0.18 per liter (i.e., 18 pence per liter, ppl). As the chart below illustrates, farmgate prices were higher through the 1990s than they are today.[14]



Clearly, milk prices have not kept pace with inflation while costs of production have, and farmers are thus under intense financial pressure. There are a number of factors behind the erosion of farm gate profitability in the UK and the interaction between these factors is complicated. An underlying reason is that dairy farmers are price takers, not price makers due to the extended nature of the dairy supply chain and fragmented nature of raw milk production. The domestic milk market for both liquid

[13] "*Agriculture in the United Kingdom 2003*"; published by the Stationery Office, London.
[14] Chart provided courtesy of the Milk Development Council, based on Defra data. Based on June 2005 currency conversion rates, £0.18/liter is roughly equivalent to $14.50/hundredweight.

milk and processed dairy products like cheese is dominated by supply to the four supermarket chains that control 70% of the UK retail market.[15] Securing and holding onto these contracts is of central economic importance to milk processors, putting supermarkets in a strong negotiating position which has allowed them to increase margins at the relative expense of producer profitability.[16]

In addition to making dairy farming economically marginal, this market failure[17] has significant consequences for the environment. Because dairy farmers can't set prices, they can't pass on costs to their customers. This severely limits the ability of dairy farmers to invest in anything that doesn't directly increase production or lower production costs. Many investments that would limit or prevent environmental problems are economically difficult to justify even for the best intentioned of farmers. Regulations that impose additional costs can greatly influence the rate by which dairy farmers leave the industry.

Government subsidies and incentive schemes also have a complicated and considerable impact on the economics of agriculture, including dairy farming. In fact, many farm businesses in the UK, the US, and elsewhere have survived for years not on their cash receipts, but on their subsidies and supplemental payments. But beginning in 2005, changes to the EU CAP will revolutionize government subsidies in the UK. Production-based subsidies will be gradually phased out and replaced with a "single farm payment" (SFP).[18] This will bring an end to the market distortions of the previous policies. The introduction of the single payment is likely to encourage significant structural and attitudinal changes at farm level as dairy farmers will be in a better position to consider the business strategy and long term viability of their farming enterprises and react to changing consumer and market demands. There will no longer be any economic reason to produce agricultural products if the production costs exceed the price a farmer is paid.

Another key factor in this new regime is that farmers will not be eligible for the full amount of their SFP unless their farm is deemed by government authorities to be meeting statutory management requirements and obligations to manage land in "good agricultural and environmental condition."

In addition, UK farmers are eligible for a range of incentive schemes under which they can earn government grant payments for adopting specified practices considered desirable (e.g., practices that promote biodiversity). Details on some of these schemes are presented in Chapter 4.

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[15] As reported by British Broadcasting Corporation (BBC) News.

[16] For further details, see "*Dairy Supply Chain Margins 2003-2004: Who made what in the dairy industry and how it has changed*"; Milk Development Council, 2004.

[17] An official government report concluded that some of the practices of the largest supermarket chains "adversely affect the competitiveness of some of their suppliers and distort competition in the supplier market... (T)hese practices give rise to a... complex monopoly situation." The report further concluded that these practices operate against the public interest, but recommended only a Code of Practice which has not yet materialized. "*Supermarkets: A report on the supply of groceries from multiple stores in the United Kingdom*"; Competition Commission, 2000. Available on the Internet at http://www.competition-commission.org.uk/rep_pub/reports/2000/446super.htm#full.

[18] In Wales, the SFP will be based on historical payments to each farmer. In England, there will be a transition period that begins with the SFP being largely based on historical payments, but within a decade the SFP will be based entirely on how much land is farmed.

1.6 Social Considerations

Dairy farmers endure work conditions that would be considered unacceptable in most other professions. A survey in 2003 of more than 1500 dairy farmers concluded that the average UK dairy farmer worked 70 hours per week and took only four days holiday per year.[19] In addition to the stress this places on farming families, these constraints make it more difficult for dairy farmers to attend training courses. It also argues against policies that depend upon significant additional effort by dairy farmers to achieve social gains.

Another interesting social consideration is the importance of agriculture and rural communities in sustaining the Welsh language. Over 50% of farmers in Wales speak Welsh, many as their first language. This is a much higher percentage than in urban areas of Wales. Indeed, the Welsh Assembly Government considers rural development to be an essential component of protecting the Welsh language and heritage for future generations.

[19] "*Focus on Farming Survey*"; Lloyds TSB, 2003.

2.0 Direct Environmental Regulation

Any consideration of public policy alternatives to "command and control" regulation must begin with a look at regulatory policies. This is especially important as we attempt to glean insights for US policy from an examination of UK policy. Without understanding the regulatory context, we risk making inappropriate inferences about non-regulatory policies.

In this chapter I will summarize the current regime for direct regulation of dairy farming in the UK. Because the goal is to provide context, I do not intend to describe in detail each and every regulation. I will then highlight some upcoming regulations that are almost certain to take effect in the near future, and explain in broad terms the Environment Agency's program for regulating agriculture. Following this overview, I will compare the existing and near-future UK regulatory context to the status quo in Wisconsin and, less specifically, the US. Finally, I'll examine how the similarities and differences are relevant as we move on to a consideration of non-regulatory alternative policies.

2.1 Existing UK Regulations

In the UK, dairy farming is exempt from some of the environmental regulations that apply to other business enterprises. Those regulatory programs that specifically effect dairy farming will be summarized below. Please note, however, that none of the following are covered in this chapter:

- requirements that are not specifically environmental (e.g., health and safety rules);
- requirements to protect habitats and/or species (as these are beyond the remit of the Environment Agency);
- requirements for participation in *voluntary* programs (these will be covered in later chapters); and,
- requirements that only apply in very unusual circumstances or to enterprises that mix dairy farming with other types of agriculture or other business ventures.

2.1.1 Discharge Consents

Under the Water Resources Act 1991 it is an offense to cause or knowingly permit a discharge of poisonous, noxious or polluting matter or solid waste to groundwater or surface water without proper authority (i.e., a discharge consent). Most dairy farms do not directly discharge effluent to controlled waters, and as a result fewer than 2% of dairy farms in England and Wales have discharge consents. It may be that a substantial number of those could eliminate their direct discharges and do without a consent, but some farmers may believe having a discharge consent is like having an insurance policy in the unlikely event that they are accused of causing pollution. And yet in theory, even if a farmer complies with a discharge consent, he or she can still be found liable for causing water pollution.

In nearly all cases, discharge consents issued to dairy farms will cover a low-volume discharge of a low-polluting effluent (e.g., stormwater collected through a drain in a concrete pad that is not accessible to animals). Typically, these could be characterized as 'descriptive consents' – in other words, they do not establish limits or control

requirements but merely *describe* discharges to which government has consented. They would not normally include monitoring or reporting requirements, but the farmer would have to pay an annual charge. The average annual charge for a dairy or beef farm has recently been about £750.

2.1.2 Silage, Slurry and Agricultural Fuel Oil (SSAFO) Regulations

The "SSAFO" regulations – officially, the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 (as amended) – are the command and control regulations that probably affect the most dairy farms in the UK.

These regulations apply to tanks for storing silage, slurry[20], or agricultural fuel oil that were built or modified after March 1991. Older tanks are exempt, but in any case the regulatory authority (Environment Agency, SEPA, or EHSNI) may issue a notice requiring control of an exempt tank if there is a significant risk of pollution. Furthermore, farmers are required to provide notification to the regulatory authority prior to constructing or modifying any structure covered by the regulations.

UK farmers have four legal options for storing silage. First, they can make field silage or store silage on open land, provided that the silage is at least 10 meters from any surface water and at least 50 meters from the nearest abstraction point for any protected water supply source, and the regulatory authority is given 2 weeks prior notice. Second, farmers may store silage temporarily in a trailer or vehicle for transport. Third, they may bale silage and seal it within impermeable membranes or bags, as long as the bags are not stored or opened within 10 meters of any surface water. Finally, silage may be stored in a silo built to British Standard 5061 or one that meets the following requirements:

- the base of the silo must extend beyond any walls of the silo and be provided at its perimeter with channels to collect any effluent which may escape, and adequate provision must be made for the drainage of that effluent from those channels to an effluent tank through a channel or pipe;
- the capacity of the effluent tank must be at least 20 liters for each cubic meter of silo capacity up to 1500 cubic meters, plus 6.7 liters for each cubic meter of silo capacity in excess of 1500 cubic meters;
- the base of the silo, the base and walls of its effluent tank and channels and the walls of any pipes must be impermeable;
- the base and any walls of the silo, its effluent tank and channels and the walls of any pipes must be resistant to corrosion from by silage effluent;
- the silo, effluent tank, channels, and pipes must be at least 10 meter from the nearest surface waters;
- if the silo has retaining walls, they must be capable of withstanding the minimum wall loadings indicated in British Standard 5502 for agricultural buildings and structures, appropriate notices must be displayed on the walls, and the silo must never be loaded to a depth exceeding the design assumptions; and
- the silo, its effluent tank and channels and any pipes must be built to last at least 20 years with proper maintenance, but if any part of an effluent tank is installed

[20] In the US, the term 'manure' is applied to both liquid and solid animal wastes. In the UK, liquid manure is called slurry.

below ground level the tank must be built to last at least 20 years *without* maintenance.

Farmers may temporarily keep up to 18,000 liters of slurry (including runoff from solid manure stores, also known as “dirty water”) in a tanker that is used for transporting slurry on roads or about a farm. All other slurry must be kept in stores meeting the following requirements:

- the base of any slurry storage tank, and the base and/or walls of any effluent tanks, channels, reception pits and pipes that handle slurry, must be impermeable and protected against corrosion;
- the base and walls of the any storage tank or reception pit must be capable of withstanding characteristic loads for the stored material;
- any facilities used for the temporary storage of slurry before it is transferred to a storage tank must have adequate capacity to store the maximum quantity which (disregarding any slurry which will be transferred directly into a storage tank) is likely to be produced on the premises in any two-day period, unless approved in writing by the regulatory authority;
- where slurry flows into a channel before discharging into a reception pit and the flow of slurry out of the channel is controlled by means of a sluice, the capacity of the pit must be adequate to store the maximum quantity of slurry which can be released by opening the sluice;
- storage tanks must have adequate capacity to hold the likely quantities of slurry produced on the premises, taking into consideration the likely rates and times of disposal, the likely quantities of precipitation that may fall or drain into the tanks, and the need to maintain an adequate freeboard;
- where slurry will be disposed of by land spreading, regardless of the previous requirement the tanks are not required to have more than four months of storage capacity but it may be advisable in some cases;
- tanks, channels, and pits must be more than 10 meters from any surface water which a spill could enter unless approved in writing by the regulatory authority;
- tanks, channels, pipes and pits must be built to last 20 years;
- where the walls of any storage tank are not impermeable (i.e. weeping wall tanks), the base of the tank must extend beyond its walls and be provided with channels designed and constructed to collect any slurry which may escape from the tank, and adequate provision must be made for the drainage of slurry from those channels to an effluent tank through a channel or pipe;
- where a storage tank, effluent tank, or reception pit is fitted with a drainage pipe there must be two valves in series on the pipe and each valve must be capable of shutting off the flow of slurry through the pipe and be kept shut and locked in that position when not in use (unless the storage tank drains through the pipe into another storage tank of equal or grater capacity or where the tops of the tanks are at the same level); and,
- storage tanks must maintain a freeboard of at least 750 mm for earthen-walled tanks or 300 mm in all other cases.

Farms storing more than 1500 liters of agricultural fuel oil must store the oil either in an underground tank, in a tanker for temporary transport on roads or about the farm, or in a tank or drums within a storage area meeting the following requirements:

- the storage area must be bunded, i.e. surrounded by an impermeable floor and walls large enough to hold a specified amount of oil based on the tank design and volume;
- the storage area must be more than 10 meters from the nearest surface waters;
- tanks must be built to last 20 years;
- all taps and valves must drain downward within the bund and be locked shut when not in use; and,
- any permanently affixed flexible pipes must have an automatic shut-off device and be locked within the bund when not in use.

2.1.3 Nitrate Vulnerable Zones (NVZ) Regulations

The European Commission adopted the Nitrates Directive in 1991 because of rising concerns about eutrophication and the cost of removing nitrates from drinking water. Under this directive, the UK designated "nitrate vulnerable zones (NVZs)" that cover approximately 55% of all land in England, 13% in Scotland, 3% in Wales, and just 0.1% in Northern Ireland. Land was designated as NVZ if it drained into water that contained or potentially contained nitrate concentrations above the European drinking water standard (50 mg/l), or drained into water that was or potentially could become eutrophic. Some critics argue that virtually 100% of the land should have been designated.

Over 70% of nitrate loadings to water are attributed to agricultural sources. Consequently, farms *within designated NVZs* are required by the regulations to:

- limit the amount of nitrogen applied to crops annually via inorganic fertilizers;
- limit the amount of nitrogen applied to fields annually via organic manures;
- limit the amount of nitrogen applied to the whole farm from organic manures, including manure direct deposited by grazing animals (often interpreted as a de facto stocking limit);
- avoid spreading on frozen, waterlogged, snow-covered, or steeply sloping land;
- avoid spreading organic manures within 10 meters of surface waters;
- avoid spreading inorganic fertilizer in a way that it would directly enter water courses;
- avoid spreading during specified periods in fall and winter (the exact dates depend on what material is being spread, on what type of land or soil, and where);
- have adequate capacity to store materials during no-spread periods; and,
- keep adequate records to demonstrate compliance.

The Nitrates Directive is not targeted specifically to dairy, but dairy farms are certainly affected. Survey data suggest that roughly 20% of dairy farms in England and Wales lie partially or totally within an NVZ. Dairy farms appear to be struggling to comply with these rules. From December 2001 through the end of 2004, only 4% of arable farms and 5% of sheep farms inspected by the Environment Agency were found not to be complying with NVZ rules, but over the same period 26% of dairy farms were found to be non-compliant.

2.1.4 Waste Management Regulations

Wastes from premises used for agriculture are currently not included in the UK definition of "controlled wastes". Most importantly, this means that farmers can spread manures and slurries on their land without regard to waste management regulations (though other regulatory requirements, such as those for NVZs, may apply). In addition, it means that management of other farm wastes is not regulated, provided the wastes remain on the farm. For example, it is legal for farms to bury wastes *from* their own land *on* their own land as long as doing so doesn't violate another regulation (for example, the groundwater regulations described below). Waste management regulations do apply if a farm accepts sewage sludge or other wastes generated off the premises. The relevant requirements are contained in the Sludge (Use in Agriculture) Regulations and the Waste Management Licensing Regulations.

The UK government encourages application of treated sewage sludge (biosolids) to agricultural land as a best practice, so long as certain requirements are met to ensure human health and the environment are protected. The application of untreated sludge is no longer carried out in the UK because of a voluntary agreement.

Requirements from the Sludge (Use in Agriculture) Regulations that potentially affect dairy farmers are summarized below (*but note that additional requirements apply to sludge producers and other types of farms*):

- all soils must be analyzed before sludge is first applied and regularly thereafter;
- sludge applications must not raise soil metals levels above specified limits;
- sludge must not be applied to soils with pH below 5.0;
- sludge application rates, in conjunction with other fertilizers, should match crop requirements;
- cows must not be grazed for at least three weeks after an application; and,
- if untreated sludge is applied to grassland, it must be injected and no sludge should remain on the surface.

Farmers may not accept wastes generated off the farm for disposal unless they have a Waste Management License. The disposal area would be regarded as a landfill and the wastes would be regulated cradle-to-grave, as in the US.

Land spreading of wastes (other than manure, slurry, and sewage sludge) also requires a waste management license, unless the spreading qualifies for an exemption. Exemptions are allowed for land spreading of certain listed wastes (e.g., soil, wood, gypsum) if the following conditions are met:

- the spreading will result in agricultural or ecological benefit on the receiving land without disbenefits that would require attention;
- it is not likely to cause pollution of the environment or harm to human health;
- the person doing the spreading notifies the regulatory authority and provides detailed information *prior* to spreading; and,
- spreading of the listed waste is limited to 250 metric tons per hectare per year (or 5000 metric tons in the case of dredgings from inland waters).

A Register of Exemptions is maintained by each of the regulatory authorities. Exempt wastes can be legally stored on a farm prior to when they are spread for an indefinite period, without a waste management license, though liquid wastes are only exempt if stored in secure containers or lagoons of up to 500 metric tons.

If a waste management license is issued for land spreading, the license will encompass any applicable requirements of the Groundwater Regulations (described in more detail below).

2.1.5 Groundwater Regulations Authorizations

Land spreading that is exempt from waste management licensing may, in unusual circumstances, still require authorization under the Groundwater Regulations 1998. The regulations apply to any material that contains any substance listed in the regulation. The regulatory authority can impose conditions on the discharge or disposal of such materials, or prohibit the activity altogether. On a dairy farm, for example, used oil generated on the premises is not a controlled waste and not subject to waste management regulations. Unauthorized disposal of used oil on land, however, would normally be a violation of the groundwater regulations because hydrocarbons are one of the listed substances.

In cases where an entity holds a discharge consent or waste management license, any conditions necessary for compliance with the groundwater regulations would be included in the consent or license rather than in a separate groundwater regulations authorization.

2.1.6 Water Abstraction Licenses

Most dairy farms in the UK get their water from centralized water distribution systems operated by a water company. A minority obtains their water from wells or directly from surface waters. Those that do obtain their water in this way are in some cases required to obtain a water abstraction license. Some regions in the UK have their own special abstraction legislation and additional requirements.

In general, it is an offense in the UK to abstract or impound water without a license. There are various exceptions, notably an exception for abstracting *small* quantities of water for specific purposes. For example, a dairy farmer may abstract up to 20 cubic meters of water in a 24-hour period for agricultural purposes other than spray irrigation.

Where a license is required, the process involves a review by the regulatory authority to establish whether any restrictions are necessary, or in the most extreme cases whether the application must be denied. The regulatory authority has broad discretion, but must ensure that any license granted is consistent with statutory duties for protection of the environment and sustainable development.

Abstraction licenses typically state the quantity of water that may be abstracted, where it may be used, the means of measurement, and the means of abstraction.

2.1.7 Planning Consent

Local governments in the UK exercise some control over development. Certain types of major development proposals require an environmental impact assessment, but the environmental regulatory authorities have only a limited consultative role. This may, for example, involve pointing out if a proposed development is "unsustainable" or if it would require any approvals or licenses. Ultimately, local governments have the responsibility for planning consent decisions and they may not always heed the advice of the regulatory authority.

2.2 Future UK Regulations

Environmental policy is not static. Several command and control regulatory programs that will affect dairy farms have already been proposed and are likely or certain to be finalized in the coming 1-2 years. These programs are summarized below.

2.2.1 NVZ Expansion

Under the Nitrates Directive, the UK must review its NVZ designations every four years. To do this, the UK must monitor nitrate concentrations and the eutrophic status of waters, produce a report of monitoring results, and use the report as a basis for designating new NVZs and assessing the effectiveness of the regulations.

In April 2003 the European Commission sent the UK a "Reasoned Opinion" stating that the UK's 2002 designation of NVZs in England, Wales, and Scotland was inadequate and the UK must do more to demonstrate full compliance with the Nitrates Directive. This is equivalent to a final written warning. If the UK does not respond to the satisfaction of the Commission, the case could be referred to the European Court of Justice and the UK could face fines of more than £100,000 *per day*.

The UK government is currently reviewing options, and it is not yet clear what approach will be taken. It is highly probable, however, that they will do whatever is necessary to avoid those fines, and that will include expanding the amount of land that is designated as NVZ. It is also possible that there will be changes to the regulatory requirements *within* NVZs.

2.2.2 Agricultural Wastes

The European Commission has initiated infraction proceedings against the UK, asserting that the UK policy of exempting agricultural wastes from regulation does not comply with the EU's Waste Framework Directive, Hazardous Waste Directive, and Landfill Directive. The UK is not challenging this assertion; rather it is proposing to eliminate the exemption for "wastes from agricultural premises" from its definition of controlled wastes.

Under the proposed new regulations, manure and slurry will still not be defined as wastes so long as they are used on the farm on which they are produced as a fertilizer or soil conditioner to benefit the land. If manure or slurry were applied in excess of agricultural requirements, the material would be considered waste and subject to regulation. And if manure or slurry were transferred off the farm where it was

produced, it would be considered waste but would be exempt from waste management *licensing* provided that it is used on another property for agricultural benefit or ecological improvement.

Whatever the form of the final regulations, it is clear that agricultural wastes will no longer be categorically exempt from waste management licensing and regulation. It is virtually certain that farmers will no longer be allowed to bury, dump, or burn waste (e.g., packaging) on their own land without a waste management license. Farmers, like other business owners, will need to make arrangements for appropriate collection and disposal of wastes generated by their businesses.

Public consultation on the proposed new regulations closed on March 18, 2005. The new regulations are expected to take effect sometime in summer or autumn 2005.

2.2.3 Water Framework Directive

The Water Framework Directive (WFD) could ultimately have a greater effect on agriculture than any other piece of direct environmental legislation in Europe. The WFD calls for EU member states to enact programs to bring all waters (inland, coastal, and groundwater) into "good ecological status" by 2015. For example, waters that have become eutrophic because of pollution would need to be brought back to their normal ecological state.

Because authorities in the UK are just now beginning to develop strategies for implementing the WFD, there is little that can be said about it at this time – but it is too important to completely overlook. Though it will not begin to affect dairy farmers in the next few years, it stands as an ominous warning of potentially drastic regulatory measures to come. Hopefully the WFD will serve as an incentive for early, voluntary efforts to curb water pollution.

2.3 Integrated Regulation of Agriculture Project

The relationships between agriculture and UK regulatory authorities are rapidly changing. Because of new legislation and the revolutionary changes to the CAP, the number of farmers who can expect a visit from the Environment Agency and other government bodies could quadruple beginning this year. Needless to say, many farmers will be dealing with regulators for the first time. In order to manage both the workload and the important relationship issues, the Environment Agency is developing an Integrated Regulation of Agriculture Project (IRAP). IRAP is the Agency's flagship for delivering a modern, outcome-focused approach to environmental protection and improvement in agriculture.

The principal goals of IRAP are to:

- instill an integrated, risk-based approach to the environmental regulation of agriculture;
- use efficient, cost-effective and proportionate regulatory methods as well as alternatives to regulation; and,

- improve the environmental performance of the agricultural sector across all media, and meet the standards required by legislation, in particular the CAP and the Water and Waste Framework Directives.

The heart of IRAP is the Agency's risk-based approach. Eventually, it will work roughly as follows. Environment Agency staff will complete agricultural site assessments using information about the site, the type of farming, past performance, etc. This will generate a comparative risk score encompassing all environmental media and environmental compliance requirements. The Agency will prioritize farm visits primarily based on these risk scores (other factors must necessarily be considered, such as statutory obligations to inspect some types of sites). Looking more broadly, risk scores from multiple sites can be used to identify those catchments that are at greatest risk in terms of the WFD. The Agency can then allocate available resources based primarily on risk.

The second major thrust of IRAP is the integrated farm visit. Environment Agency frontline staff will be expected to conduct integrated agricultural inspections, assessing both risk and compliance across all regulatory regimes and environmental media. Visits are not to take more than 2 hours of the farmer's time. This is a tall order, but the comment is consistently made that if we expect a single farmer to be able to comply with all the rules, it isn't unreasonable to expect a single regulator to understand those rules. Furthermore, the Environment Agency projects that this approach could halve the amount of staff time needed to regulate farms, compared to projections of the traditional approach. In any event, a concerted effort will be made to train Agency frontline staff who specialize in agricultural visits to ensure they have the competence to do integrated visits. The Environment Agency has also been deliberately recruiting staff with agricultural backgrounds and expertise.

Information will be critically important to IRAP. The Environment Agency plans to build an Integrated Site Database (ISD), which will be the backbone of the risk-based approach described above. The ISD will be used for the risk assessments, but also to pre-populate special Integrated Farm Inspection Forms that Agency staff will use for farm visits. Data from each farm visit will then be fed back into the ISD and the risk models can be updated based on current compliance and risk information. In some cases this will also be used to assess annual charges that certain types of farms (currently, only confined pig and poultry operations) must pay.

IRAP seeks to encourage full use of alternatives to regulation, in particular environmental management systems (EMS) as described in Chapter 5 of this report. The approach also involves a great deal of linking to and coordinating with other organizations that conduct farm inspections (e.g., health and safety regulators) or offer farm advice. Coordinated internal and external communications strategies are in development.

2.4 Comparison to Wisconsin Regulations

Wisconsin's "command and control" regulations for protecting the environment from agricultural pollution are similar to UK regulations in many respects, but differ in a few important ways. In this section I will simply try to summarize relevant Wisconsin

regulations, explain in general terms how Wisconsin may differ from the rest of the US, and note any significant differences from the comparable UK policies.

2.4.1 Wastewater Permits

In both countries, direct discharges from feedlots or manure storage areas are forbidden unless a permit (consent) is obtained. But in Wisconsin, and in fact throughout the US, *large* confined animal feeding operations (CAFOs) require a wastewater permit under the National Pollutant Discharge Elimination System, regardless of whether they have any direct discharges to water. For dairy farms, the threshold for mandatory permitting is 710 milking cows. Every dairy farm of that size with indoor feeding operations requires a wastewater permit. In Wisconsin, the Department of Natural Resources (WDNR) also has the authority to require smaller farms to obtain a permit under certain unusual circumstances. More than 100 Wisconsin dairy farms now hold wastewater permits.

Wastewater permits specify the technical design requirements and operational restrictions or requirements that are necessary to protect surface waters and groundwater. In order to comply with the permit, the farmer must also submit a finalized Manure Management Plan (based on the conditions of the issued permit), a monitoring and inspection program, and annual reports summarizing the land spreading of manure. Fees are charged annually and CAFO permits must be renewed every five years. Farmers must also notify the WDNR of any proposed construction or management changes.

2.4.2 Runoff Rules

The US does not have national regulations governing diffuse pollution from agricultural runoff. Wisconsin, however, adopted regulations in 2002 to control soil erosion and manure runoff from farm operations of literally all sizes. These rules establish performance standards for farms, but do not go so far as to require permits, monitoring, reporting, or fees. The performance standards are similar to some of the requirements typically found in CAFO permits.

The Wisconsin runoff regulations embody some of the same concepts that are found in the UK's SSAFO regulations. Both demand that manure/slurry stores built or modified after a specific date meet published design standards. Wisconsin's rules go slightly beyond the UK rules in at least two ways. They do not exempt older stores, but impose only very basic operational requirements such as maintaining stores to prevent overflow. They also require farmers to divert clean water away from barnyards, feedlots, and manure storage areas that lie within designated "water quality management areas" (specifically, areas within 300 feet of a stream or 1000 feet of a lake, and areas susceptible to groundwater contamination). On the other hand, Wisconsin rules are less stringent than UK rules in other ways. Wisconsin allows open manure stacking except in water quality management areas, while UK rules do not allow it in farmyards and field stacking, at least in theory, could require a groundwater authorization. Finally, Wisconsin imposes no specific requirements for silage.

Other parts of Wisconsin's runoff rules are more comparable to the UK's NVZ regulations. In most aspects Wisconsin's rules are neither as specific nor as comprehensive, but they do apply statewide and not just in vulnerable areas. Instead of imposing specific numerical limits for nitrogen applications or specific storage capacity requirements, Wisconsin only requires farmers to develop and follow a nutrient management plan for land spreading. Wisconsin also allows spreading throughout the year on any agricultural land, notably including frozen or snow-covered land. Wisconsin is more stringent than the UK when it comes to animal access to surface waters and erosion. Whereas the NVZ rules don't specifically address these issues, Wisconsin's runoff rules require farmers to limit livestock access to surface waters, maintain adequate sod cover along waterways, and meet tolerable soil loss levels on any crop land.

Wisconsin's runoff rules acknowledged that smaller farms might struggle to meet the costs of complying with the performance standards. The rules therefore stipulated that owners of farms that had fewer than 178 dairy cows when the rules first took effect would not be forced to change an *existing* facility or cropland practice unless government offered to share at least 70% of the cost. Furthermore, these farms could expand up to 213 dairy cows without meeting the performance standards, unless cost sharing was provided.

2.4.3 Solid Waste Regulations

In the US, agricultural wastes have never enjoyed any special regulatory status. The Resource Conservation and Recovery Act (RCRA), which is the primary waste control legislation, includes agricultural waste in its definition of solid waste. American farmers have been managing wastes for years in ways that will soon become familiar to UK farmers.

Wisconsin regulations do allow for land spreading, provided the material has value as a soil conditioner or fertilizer and is applied in accordance with accepted agricultural practices. The following common materials can be spread *without* prior approval so long as the farm is operated and maintained in a safe, nuisance–free manner: animal wastes, whey, vegetable processing wastes, and soil contaminated with agricultural chemicals. Most other materials (e.g., industrial sludges or wood ash) require a land spreading plan with prior written approval by WDNR, and are subject to special limitations, restrictions, testing, or operational requirements.

2.4.4 Water Use Approvals

Water use laws vary profoundly across the US, but Wisconsin protects water resources in much the same manner that the UK does. Any farm abstracting more than a specified amount (70 gallons per minute) from groundwater requires a high capacity well approval. A permit is also required for any diversion of surface water for irrigation purposes. Wisconsin farms are not as likely as UK farms to have access to municipal water systems, so these types of approvals are more common in Wisconsin.

2.4.5 Plan Approvals

A variety of additional approvals may be required in Wisconsin (or elsewhere in the US) prior to constructing, expanding, or substantially modifying dairy farm buildings or operations. The specific requirements always depend on the location of the farm. To begin with, construction plans in Wisconsin are frequently subject to approval by local government via building permits or conditional use permits. A town or county may have also local ordinances that establish special requirements regarding siting, manure storage, erosion control, etc. However, recent livestock facility siting legislation in Wisconsin seeks to ensure that local governments will approve projects meeting minimum statewide standards. In general, this type of plan approval seems to be consistent with policy in the UK. In addition, regulations would require a Wisconsin farmer to obtain a construction site stormwater permit from WDNR if the project will disturb more than one acre of land, or other types of permits/approvals if the activity could affect navigable waters or wetlands.

2.4.6 Air Pollution Regulations

In the UK, pig and poultry farms are covered under the Integrated Pollution Prevention and Control (IPPC) regulations but dairy farms are not. In fact, they are not subject to any air emission limits or control requirements. The status of dairy farms in the US is not so simple. The most significant US air pollution regulations are triggered when emissions exceed specified amounts, regardless of the industry producing the emissions. There is no special exception for dairy farms.

There is currently a tremendous amount of scientific and political debate in the US about whether large farms are (or should be) required to have air pollution permits or otherwise limit emissions. This is also the subject of litigation, in Wisconsin and elsewhere. Most observers think it likely that large CAFOs will be subject to air pollution regulations and permits in the near future, unless lawmakers grant them a specific exemption.

2.5 Relevance to Non-Regulatory Alternatives

The single most important point to emphasize is that there are many similarities in the basic environmental issues and regulatory approaches for dairy farms in the UK and Wisconsin. Two stand out above the rest. First, in both places the regulatory emphasis has been and still is on water quality. And second, in both countries the size of the dairy sector, its economic fragility, and constraints on government spending all argue against traditional command-and-control approaches to the unresolved environmental issues. Given these and other similarities in the regulatory context, as well as similarities in the size of the dairy sector and the economics of dairy farming, it is not unreasonable to proceed on an assumption that non-regulatory policy options from one locality could potentially be adapted for use in the other.

Despite the many similarities, there are several significant differences that also must be considered as we move into our examination of non-regulatory approaches.

- Politics – For the foreseeable future, the prospects for new environmental legislation are much higher in the UK than in the US. This may be partially offset by ongoing US litigation over existing environmental laws, which could spur new requirements for US dairy farms. But in general the political clout of agriculture in

the US and Wisconsin, though not tremendous, is currently much greater than it is in the UK. In Wisconsin, dairy farmers don't exactly get what they want but their complaints about regulation fall on friendlier ears than they would in the UK.

- Farming systems – Most dairy farms in the UK rely on extensive grazing, while feedlots are more the norm in Wisconsin. The environmental issues and the most promising potential approaches will not always be the same.
- Drinking water sources – Because so many in Wisconsin get their drinking water directly from groundwater, contamination from nitrates or other pollutants is seen as a public health issue. In the UK, where there is greater dependence on public systems that remove nitrates from drinking water, the same issue is more likely to be perceived as an economic or public spending issue.
- Emphasis on farm size in Wisconsin – In Wisconsin, dairy farms face additional regulations if they expand beyond a certain size. Not only does Wisconsin provide this disincentive for herd expansion, the runoff rules also make it easier for farms to get financial assistance if they are small.[21] UK regulations do not differentiate based on livestock numbers.
- Emphasis on location in the UK – Some 20% of the dairy farmers in England and Wales face substantial regulatory challenges that the other 80% do not, because of their location within an NVZ. This could change if more areas are designated, as is expected. Until then, it creates an uneven playing field. Nothing in Wisconsin agriculture is truly comparable to this situation.[22]
- "Factory Farms" – Siting and planning consent appear to be much more controversial and confrontational in Wisconsin than in the UK. The outright hostility toward large dairy farms that is increasingly seen in Wisconsin communities is not evident in the UK. This could be a cultural difference, a difference in the number of CAFOs, or something else. Regardless, in Wisconsin and other places in the US, social issues are as real a threat to farm survival as economics, and the desire or need for social acceptance may drive future environmental improvement as much as government regulations.
- Emphasis on compliance assurance versus penalties – UK regulatory authorities put a relatively higher priority on compliance assurance (inspections, etc.) and a relatively lower priority on penalties for violations, compared to US regulators. The Environment Agency, for example, conducts literally thousands of inspections on farms every year. Their philosophy seems to be "you might as well comply, because we're watching and we'll catch you if you don't." With this comes the understanding that they don't try to regulate unless they have the resources to keep a close watch. In the US, however, the philosophy is more like "we might not catch you, but if we do you'll *really* be sorry." This attitude lends itself more to command-and-control regulation, because the regulatory authority can propose rules without as much concern for implementation costs. The high cost of a violation is thought to offset the low risk of getting caught, leading to reasonable compliance rates. This may explain why the US is moving more toward water (and potentially air) permits for dairy farms, while the UK is not.

[21] Note, though, that grant dollars from several economic development programs in the US and Wisconsin go overwhelmingly to *large* farms.

[22] The UK approach is analogous to US air quality nonattainment areas, which sorely challenge the competitiveness of manufacturers located in those areas.

3.0 Education and Advice

The most straightforward way to improve environmental performance without imposing direct regulations is to concentrate on behavior change. Traditionally, environmental policy has been based upon a two-pronged approach to behavior change. The first prong, direct regulation, we have already discussed in the previous chapter. And later in this report we will look at some new, untraditional approaches that are proving quite successful and/or showing great promise. But for now, in this chapter, we will concentrate on the second part of the traditional approach, which involves formal and informal education programs, as well as "hands on" technical assistance and advice.

Many of the topics discussed in this chapter will be familiar to any reader. In those cases, an overview is presented but little detail is provided. We aim instead to focus most of our attention on the aspects of education and advice programs in the UK that are out of the ordinary, innovative, or especially relevant to the subject of environmental performance for agriculture in general or dairy farms in particular.

We'll begin the chapter with a very quick look at educational programs. From there, we'll move on to a summary of published information and advice that is targeted toward agriculture. The next subject, on-farm advice, will require more detail and explanation because it is there that we begin to see significant differences between UK and US approaches. Finally, the chapter will conclude with a look at demonstration farms in the UK and how they are used to promote environmental improvement.

3.1 Classroom Education and Other Formal Training

In this section we will look at two specific areas of education. The first might be called traditional agricultural education. This topic is included primarily to put the subject of education and advice in context. The second area included in this section is more germane to collaborative environmental policies, as it looks at a professional development program intended, among other things, to improve the environmental awareness of agricultural advisers.

3.1.1 Agricultural Education

The UK is home to about 20 colleges and universities that offer an agricultural or horticultural curriculum. Degrees are offered at all levels, from the equivalent of an associate's degree all the way through to doctoral degrees. None of this is unusual or particularly noteworthy in a policy discussion. However, it is worth noting that many of these institutions have specific programs for environmental research and education *within their agricultural curricula*. Most also have on-site farms for research and/or demonstration purposes.

An institution called the UK Dairy Academy offers continuing adult education for dairy farmers. Courses are taught by national experts and are subsidized by Defra, which keeps costs down to about £40 per person per day. Although the UK Dairy Academy emphasizes profitability and does not offer environmental courses per se, it

does provide training on aspects of dairy farming that can have serious environmental impacts if mismanaged.

3.1.2 BASIS (Registration) Limited

The British Agrochemical Standards Inspection Scheme (BASIS) was created in 1978 specifically to establish and assess standards for the pesticide industry. Today, BASIS (Registration) Limited is an independent organization that serves the pesticide and fertilizer industries by establishing standards of professional competency and offering related training, certification, and registration services. The BASIS Registration Board consists of representatives of relevant trade associations and governmental bodies. The Board has an independent chairman.

BASIS currently offers a wide variety of programs. Those relevant to this report are outlined below.

- Professional Register – Since 1992, BASIS has maintained a register of persons qualified to give advice on pesticides and fertilizers. To be listed on the register, a person must meet the qualifications for a BASIS or FACTS certificate (to be described below), agree to abide by a Code of Ethics, and maintain their technical knowledge through continuing professional development credits.
- Certificate in Crop Protection – In the UK, anyone involved in the storage, sale and supply of pesticides for use in agriculture, horticulture or forestry must hold a Certificate of Competence or be under the direct supervision of someone certified. BASIS sets the standards for this certificate and maintains a list of approved trainers. Courses last two days and are followed by a certification examination. It is possible and acceptable to take the examination without taking a course from an approved trainer, but not recommended.
- Fertilizer Advisers Certification and Training Scheme (FACTS) – Although there are no legal requirements for anyone to hold a FACTS certificate, here too BASIS has established standards and maintains a list of approved trainers. FACTS courses last five days and also conclude with a test.
- Advanced Crop Module – This training builds on the certificate in crop protection and addresses issues at a more advanced level, including weeds, pest and disease control, crop assurance, marketing, and food industries.
- Plant Protection Award – This advanced certificate covers the technology of crop protection, including formulation of pesticides, modes of action, and health and safety considerations.
- Biodiversity and Environmental Training for Advisers (BETA) – This training program aims to promote best practices for pesticide use with respect to the protection and enhancement of biodiversity. Topics covered include biodiversity, agri-environment schemes, crop protection management plans, environmental information sheets, integrated crop management, and integrated farm management.[23] Encouraging practitioners to take this training is a key action item in the Pesticides Voluntary Initiative, discussed in Chapter 6 of this report.

[23] Agri-environment schemes are described in detail in Chapter 4 of this report. Environmental information sheets provide clear product-specific environmental impact information for pesticides and highlight any measures necessary to ensure environmental protection. They are conceptually similar to Material Safety Data Sheets used in the US.

- Soil and Water Management Certificate – This certificate complements the areas covered in the Plant Protection Award and BETA qualifications. Here again, the connections to environmental performance are explicit. For example, the curriculum includes subjects such as soil protection, air quality protection, and the effects of organic fertilizers on non-point water pollution.
- Diploma in Agronomy – BASIS has recently begun offering this diploma to anyone who qualifies for all six of the certificates listed above. The diploma is intended to establish a comprehensive framework for enhancing the training and qualifications of persons involved in on-farm advice and sales.

3.2 Published Information and Advice

An extraordinary amount of information has been published in the UK looking at the environmental aspects of agriculture. One can easily find documents and web pages devoted to virtually any environmental issue, often tailored specifically to certain types of farming (e.g., dairy). The number of different organizations and individual authors writing on these subjects is itself impressive.

In this section we will sample some of this published information. Our objective is not to provide an exhaustive literature review or bibliography, but rather to highlight some of the better known or more interesting examples. This will include written documents, web pages, and software packages. More importantly, we'll look at some of the inherent advantages and disadvantages of using publications as a policy tool.

3.2.1 Written Publications

When it comes to the subject of environmental performance, agricultural stakeholders most often frame the issues in the context of best practices. It is far less common in agriculture than in other industries to focus on quantified environmental results or continual improvement. Instead, the normal approach is to define "best practices" in a way that includes practical considerations, and to promote the adoption of these practices within the agriculture sector. This is an extremely pragmatic approach that is well suited to the no-nonsense management style of most farmers. It also makes sense for an industry that is economically fragile, where very few businesses can afford to seek an ideal level of environmental performance. The best practices approach is reflected in many of the most authoritative UK publications addressing agriculture and environment. Here are but a few examples of note.

- "*Best Farming Practices: Profiting from a good environment*"; Environment Agency, January 2001. Available on the Internet at http://publications.environment-agency.gov.uk/pdf/PMHO303C17K-e-e.pdf.
- "*Prevention of Environmental Pollution from Agricultural Activity: A Code of Good Practice*"; Scottish Executive; 2005. Available on the Internet at http://www.scotland.gov.uk/library5/environment/pepfaa.pdf.
- "*Arable Cropping and the Environment – a Guide*"; Home-Grown Cereals Authority and Defra, January 2002. Available on the Internet at http://www.hgca.com/document.aspx?fn=load&media_id=1936&publicationId=893.
- "*The 4 Point Plan: Straightforward Guidance for Livestock Farmers to Minimise Pollution and Benefit Your Business*"; Scottish Executive, Scottish Environment

Protection Agency, Scottish Agricultural College, et al., 2004. Available on the Internet at http://www.sepa.org.uk/pdf/publications/4pointplan.pdf.

One especially thorough series of publications should also be mentioned. The UK Ministry of Agriculture, Fisheries and Food (MAFF) was merged with other governmental bodies in 2001 to form Defra. In 1998, MAFF published three documents summarizing best practices for environmental protection.

- "*Code of Good Agricultural Practice for the Protection of Water*"; MAFF, 1998.
- "*Code of Good Agricultural Practice for the Protection of Soil*"; MAFF, 1998.
- "*Code of Good Agricultural Practice for the Protection of Air*"; MAFF, 1998.

These are often referred to simply as the Water Code, the Air Code, and the Soil Code. All three codes are available for download from the Internet at http://www.defra.gov.uk/environ/cogap/cogap.htm. The unusual thing about these codes was how best practices were linked to regulatory compliance. Adherence to the codes of good practice is not mandatory for any farmer, but under the Water Resources Act (refer to chapter 2) the Water Code is considered "statutory." This means that if a regulatory compliance issue ends up in court, the court will be very interested in whether the farmer adhered to the Water Code. Though following the Code is not by itself a sufficient defense against a charge of causing pollution, any failure to follow the Code can be entered into evidence and can be particularly damning.[24]

As a policy tool, written advice on best practices has a few obvious strengths but also has serious limitations. Without question, putting advice down on paper adds clarity and consistency to whatever message is communicated. It is also relatively easy and inexpensive to produce written documents. But unfortunately, publications aren't always an effective way to communicate with farmers. As noted in Chapter 1, the average farmer works long hours and has little free time for reading. Farmers also tend to be "hands on" learners, preferring workshops or demonstrations to instruction manuals. Finally, we should note that written advice can never offer more than a snapshot of best practices at the time the document is published. Since best practices and legal requirements evolve over time, these documents inevitably become dated. For example, revisions to the 1998 MAFF Codes are already under consideration.

3.2.2 Software and Online Tools

Electronic publications (web pages and software packages) have several advantages over paper publications. First of all, they are generally faster and cheaper to produce. If the information is kept in a centralized location, it can easily be updated in ways that written publications never can, making it useful for a longer period of time. A third advantage is that web pages and software can be designed as expert systems, where the farmer answers questions in order to focus only on information relevant to their specific circumstances. One last advantage we'll mention is that these tools can

[24] Another example is the Code of Practice for Sale and Supply of Pesticides, which is recognized as a statutory code under the Control of Pesticides Regulations 1986. This Code recommends annual independent assessments and specifically names BASIS, described in section 3.1.2 above, as an independent assessor.

be more than simply informative – they can make calculations, automatically file reports, and accomplish other useful tasks to make the farmer's job easier.

As with written publications, a wide variety of software and online tools are available to UK farmers, many for free. We will briefly look at three examples.

PLANET is the nickname for a software package officially called Planning Land Application of Nutrients for Efficiency and Environment. Sponsored by Defra and the Environment Agency, this interactive computer program helps farmers develop nutrient management plans in accordance with industry standard fertilizer recommendations. After the farmer enters information describing their fields, crops, and farming operations, PLANET can generate field-specific recommendations for applying manures and nutrients. These recommendations take into consideration nitrogen, phosphates, potash, magnesium, sulfur, sodium, and lime and are applicable to arable crops, horticulture, or pastures. PLANET also can store actual land spreading information, generate records that may be needed for regulatory compliance, and keep the results for use in generating next year's recommendations.

Farmers can download the PLANET software or order a compact disk (CD) copy for free and register to receive updates at www.planet4farmers.co.uk. Training workshops are offered for £60. Since the launch of PLANET in June 2004, more than 1500 farmers have registered. The Environment Agency frequently promotes PLANET by noting that it is free, it can help the farmer comply with regulations, it can help reduce costs of purchased nutrients, and it makes qualifying for incentive schemes and grant programs easier.

NetRegs is a web-based guidance system that helps businesses identify applicable regulatory requirements. It is available on the Internet for free at http://www.environment-agency.gov.uk/netregs/. The system is structured around business sectors. Within the agriculture sector, it is further divided into crops, livestock, animal boarding, pest control, and landscaping. A dairy farmer would begin using NetRegs by going to the livestock page, then clicking on Dairy and Beef Cattle Farming. This leads to a page that show 13 different processes (e.g., land spreading of effluent and solid manure). For each process, NetRegs summarizes the relevant issues and applicable legal requirements. The website also provides links to regulations, best practice guidance, and other helpful web pages. NetRegs is similar to Wisconsin's Permit Primer in some ways.

The Environmental Management System for Farms (EMSF) is another particularly promising example of a web-based tool for farmers. However, we will only mention EMSF in passing here, as this tool is described in detail and put into a larger context in Chapter 5 of this report.

3.3 On-Farm and Other Interpersonal Advice

In this section we'll look at the programs of various organizations that provide face-to-face advice to farmers on environmental issues. Face-to-face advice in most cases occurs on farms, but all of these organizations are regularly seen at conferences and trade shows for farmers and the agricultural industries, and some offer telephone

consultation as well. These organizations also offer published advice and conduct or are involved in research.

We will begin by looking at government advisory services and services provided by third parties on behalf of government in England. Following that, we'll look at Farming Connect, the Welsh model for farm advice, which uses a network of governmental and non-governmental advisors. Lastly, we will look at how non-governmental organizations in the UK are involved in on-farm advice. The involvement of environmental groups in agricultural advice appears to be far greater in the UK than it is in the US, making this a particularly interesting subject for consideration.

3.3.1 Advice Provided by or Funded by Government

The UK has a 60-year history of taxpayer-funded advice for farmers. But in the last 15 years the nature of the advice and the way it is delivered has changed substantially, especially in England. When one considers the history of this government service, it is easy to understand why farmers might be confused or discouraged.

It all began in 1946 with the creation of the National Agricultural Advisory Service. This organization, which eventually grew to employ over 3000 civil servants, offered general agricultural advice and established the UK's first demonstration farms. In 1971, the service was reformed and became the Agricultural Development and Advisory Service (ADAS). ADAS ultimately grew to about 5000 employees and had roughly the same mission as its predecessor – until 1986. That year, a major review of all government services (called Next Steps) concluded that farmers should pay for advice. ADAS was reorganized in 1992 and immediately charged with recovering 6-7% of its costs from the farmers who used its services. By 1997 ADAS was directed to recover 100% of costs. At that time, ADAS became a private company. About one-third of the organization's previous budget was retained for the new Farming and Rural Conservation Agency, which only gave advice on subjects thought to be of broader benefit to the public (e.g., wildlife conservation).[25] By 2001 this agency only had authority in England and it was once again reorganized, this time becoming the Rural Development Service (RDS) within Defra.

RDS now offers technical advice to farmers in England on conservation and agri-environment grant schemes. But legislation was passed in 2005 that will lead to the merger of RDS, English Nature, and the Countryside Agency into a new government entity called Natural England. The interaction between Natural England, Defra, and the Environment Agency will be of particular importance to farmers. Many of the roles and responsibilities have yet to be decided, but everyone agrees that coordinated advice on regulations, agricultural subsidies, and incentive payments is badly needed. Farmers in England find a situation that is once again in flux, and at a time when they

[25] The net effect of all these organizational changes is that there is currently no comprehensive farm advice or extension service in England. Though Scotland and Wales have to a certain extent retained such services, the impact on the UK is nevertheless profound. There are many private agricultural consultants working throughout the UK, but most farmers can't afford to hire them. In England, and to a lesser extent in the other countries, farmers can only get free advice on many important subjects from people trying to sell products (e.g., agri-chemical salesmen). This advice is not necessarily objective and the person providing the advice may or may not be professionally qualified to do so.

desperately need advice. However, recent interest in delivering advice at the catchment (i.e., watershed) level may be cause for optimism.

The Environment Agency, RDS, and English Nature are currently testing the idea of having government employees serve as Catchment Advisors. The test is focused on four pilot catchments. The idea is that the Catchment Advisor will identify local land uses and activities that may affect water quality in a specific catchment, develop potential management solutions for improving water quality enough to meet the requirements of the Water Framework Directive (mentioned in Chapter 2), and facilitate action in collaboration with land owners, facility operators, and other stakeholders. Farmers would be an important audience for this effort. In addition, the Environment Agency is planning to create at least eight "catchment coordinators" in the coming 1-2 years and has talked about wanting to have one such person in each of 120 priority catchments by 2009. Meanwhile, Defra has taken public comments on how to spend £25 million for early action on the WFD. One of the options is to create "catchment support officers." The Environment Agency commented favorably on this proposal, but there is still much debate over what organization should employ these officers. It is impossible to predict how these events will unfold, but it seems highly likely that farmers will ultimately have greater access to free government-funded environmental advice at the local level.

Finally, we will mention that taxpayer-funded advice for farmers in England has recently been increased, but the advice is delivered by the private sector. This year Defra announced that it had awarded three large three-year contracts to private sector consulting firms which would in turn offer free advice to farmers.

One contract went to a firm called Momenta. This contract concerns cross compliance and the single payment scheme, both of which are explained thoroughly in Chapter 4 of this report. Momenta has created a web page, http://www.crosscompliance.org.uk/, explaining the services offered. Publications and advisory workshops are a key aspect of those services.

The other two contracts went to ADAS, which is now a private sector consulting firm. One contract concerns advice to farmers on conservation and the Entry Level Stewardship scheme, also explained in Chapter 4. The other contract is for "Environment Sensitive Farming" which is a catch-all phrase for reducing non-point pollution from agriculture. ADAS will deliver advice to both farmers and contractors through conferences, workshops, farm walks and individual farm visits. In addition, they will coordinate the formation and convening of farmer discussion groups. The website for this initiative is http://www.environmentsensitivefarming.co.uk/.

3.3.2 Farming Connect

Wales has not completely followed England's path toward privatization of farm advice services. What they've come up with is an innovative, farmer-friendly advice network called Farming Connect. Farming Connect is a collaborative effort sponsored by the Welsh Assembly Government, the Environment Agency, and other key agencies. The model they use for farm advice is to have a network of facilitators throughout Wales who know how to tap into advice services – in both English and Welsh – on a wide range of subjects. The facilitators are not themselves the advisors,

or not always. Rather, they serve as a single point of contact. Regardless of what type of question the farmer has, they can call their local Farming Connect facilitator.

Farming Connect combines many of the education and advice services described throughout this chapter. In fact, the range of services offered by Farming Connect spans all of the following subjects:

- business development plans;
- training;
- capital grants;
- Centers of Excellence and demonstration farms;
- technical advice;
- technology transfer; and,
- environment and pollution control.

Some of these services are worth describing in greater detail. For example, every farm in Wales that meets certain reasonable eligibility criteria is entitled to a free Farm Business Development Plan developed by a business consultant of the farmer's choice. This process is a prerequisite for using many of the Farming Connect services and also helps the farmer access a variety of capital grant programs. Farming Connect also maintains a free telephone helpline and publishes many bilingual brochures explaining diversification opportunities and other subjects of interest to farmers.

3.3.3 Farming and Wildlife Advisory Group

The Farming and Wildlife Advisory Group (FWAG) was created in 1969. For more than 35 years this organization has brought farmers and conservationists together to promote sustainable farming practices. Today, FWAG consists of a network of more than a hundred professional farm conservation advisers, working throughout the UK in more than 50 different regional groups. Each regional group is led by a volunteer committee of farmers and trade organization representatives with extensive knowledge of local conditions and issues.

FWAG offers on-site personalized advice to farms of all types and sizes. Their services focus on conservation practices which improve environmental performance without compromising productivity or profitability. Using a whole farm approach, the FWAG adviser will assess the natural resource assets of a farm, identify opportunities for improvement, and deliver a report with recommendations. There is a strong emphasis on no-cost options for improvement, but FWAG will also advise farmers on available grant schemes (refer to Chapter 4 of this report) and even help with applications. The scope of the advice offered includes biodiversity protection and enhancement, waste management, use of agricultural chemicals, and pollution control.

FWAG visits are generally free, but farmers are normally charged a small fee for follow-up visits. The amount of the fee depends on the type of work performed. Most of FWAG's costs are covered not by these fees, but by membership fees and donations. Members get priority access to advisers as well as other benefits (updates on legislation, telephone support, invitations to training days, etc.).

In a typical recent year, FWAG completed more than 9,000 farm advice visits. They also organized dozens of discussion forums and conferences, conducted 160 training days and arranged 370 farm tours. FWAG has recently worked on a three-year Dairy Stewardship Pilot Project with the goal of learning how to make stewardship grant programs (again, refer to Chapter 4) attractive to dairy farmers. They have also coordinated the development of a Soil and Manure Utilization Strategy covering multiple farms in one catchment in Somerset. This innovative regional approach could provide insights needed throughout the UK for meeting the WFD.

3.3.4 Linking Environment And Farming

LEAF (Linking Environment And Farming) was established in 1991 to develop and promote Integrated Farm Management (IFM). The idea for LEAF was formed by a group of farmers, environmentalists, food and agricultural organizations, consumers, government employees, and academics. These stakeholders wanted to create an organization that works *with* farmers and is dedicated to promoting sustainable agriculture. LEAF's mission statement expresses a commitment to "viable agriculture which is environmentally and socially acceptable and ensures the continuity of supply of wholesome, affordable food while conserving and enhancing the fabric and wildlife of the British countryside for future generations."

LEAF is a membership organization that gets roughly three-fourths of its funding from grants and membership subscriptions. Rates for farmers are kept below £60 per year. LEAF has an Executive Director, a small staff, and an Advisory Board made up of members representing national government departments, farmers, supermarkets, conservation, environmental and consumer groups, educational establishments and industry bodies. Not surprisingly, LEAF emphasizes collaboration, teamwork, and partnerships in virtually every aspect of its operations.

IFM is the centerpiece of everything LEAF does. IFM, as the term is used by LEAF, is meant to be a practical, straightforward approach to farming that combines the best of traditional farming methods and modern technology and research. For example, the traditional practice of crop rotation can be enhanced by bringing to bear the most current research on plant nutrition to optimize the use of supplemental pesticides and fertilizers and minimize environmental risks. LEAF promotes IFM by:

- encouraging farmers throughout the UK to adopt the approach;
- coordinating a network of innovation centers and demonstration farms (described later in this chapter);
- educating and informing consumers about IFM, its benefits, and the good work of LEAF member farmers;
- collaborating with researchers and others to develop new farming practices and new methods for communicating this information with farmers; and,
- advising and lobbying government officials and civil servants to influence decisions, regulations, and legislation.

LEAF also offers its members a free copy of the New LEAF Audit, a detailed self-assessment and whole farm management tool. The tool is designed to help farmers appraise their current practices, improve those practices through IFM, and set targets for improving the business while enhancing the environment.

The New LEAF Audit is available in CD and paper formats. It normally takes three to five hours to complete, but can be completed piece by piece as time allows. The audit is divided into eight sections:

- organization and planning;
- soil management and fertility;
- crop protection;
- pollution control and management;
- animal husbandry;
- energy efficiency;
- landscape and nature conservation; and,
- community relations.

Much of the value of the New LEAF Audit is that it goes beyond simply assessing whether best practices are used. The CD version includes a built-in help feature with links to relevant web pages and publications. The tool also provides instant feedback on business and environmental performance, benchmarked against the performance of others. Perhaps more importantly, it identifies potential problem areas, helps ensure that legal and other obligations are met, and suggests realistic actions for improving performance. Finally, the CD version allows for simple on-line reporting, storage, and retrieval of the complete audit results

The value of completing a New LEAF Audit is recognized by other parties as well. Defra has agreed that completion of an audit will earn several points toward qualifying for Entry Level Stewardship (to be explained in Chapter 4). The audit is also accepted as equivalent to having a Crop Protection Management Plan for the purposes of the Pesticides Voluntary Initiative (refer to Chapter 6).

Having made so much progress promoting IFM to farmers, LEAF is now focusing much of their attention on outreach to consumers. In 2002 LEAF launched one of the first environmental labels for fruit and vegetables, the LEAF Marque. The LEAF Marque will be described in detail in Chapter 6 of this report when we look at the subject of environmental brands and labels.

With a staff of less than ten and an annual budget under £400,000 LEAF is a small organization that has a big impact. The LEAF network now includes about 50 demonstration farms and more than a dozen innovation centers. In a typical recent year, 2003, more than 10,000 people visited LEAF demonstration farms, more than 2000 copies of the IFM Handbook were delivered to farmers, and over 3000 copies of the New LEAF Audit CD were distributed.

3.3.5 Royal Society for the Protection of Birds

The Royal Society for the Protection of Birds (RSPB) is the largest environmental organization in Europe, with a budget of over £50 million per year, 1300 employees, and more than a million members. RSPB's approach to farmers and farming is rather different than the approach of most US environmental organizations. Without question, they put a lot of effort into influencing government policy (for example to increase funding for conservation or toughen pollution regulations). But that's not all

they do. RSPB also conducts extensive research on wildlife conservation and offers written and on-farm advice to farmers. Recognizing that farmers manage 75% of the land in the UK and that farmland birds have been in steep decline, RSPB has deliberately chosen an approach that includes far more collaboration and consultation with farmers than we have generally seen from US environmental groups.

Most of RSPB's advice for farmers is offered through written publications, such as their series of "Farming for Wildlife" and "Farming for Birds" fact sheets. But RSPB has demonstrated a willingness to work on the farm with farmers in a consultative role and has over 100 such projects under way in the UK. One example is the Volunteer and Farmer Alliance Plus project. The goal of this project is to complete bird surveys on at least 180 farms in East Yorkshire over a three year period, to encourage sustainable farming practices that promote bird conservation, and to help farmers enroll in government-funded stewardship schemes. More than 50 RSPB volunteers are involved. The work specifically targets birds of prey and birds of particular conservation concern. Farmers receive lists of bird species sighted and detailed information on how to enhance populations without disrupting farm productivity.

It's worth mentioning in conclusion that RSPB probably has more credibility than its US counterparts within the farming community and with government regulators. In fact, the Chief Executive of the Environment Agency was formerly Chief Executive of RSPB, and two of the Agency's agricultural policy officers and at least one of their agricultural field officers were hired away from RSPB.

3.4 Demonstration Farms

We have previously noted that farmers tend to be "hands on" learners. Not surprisingly, demonstration farms appear to be a preferred approach in the UK for educating, informing, and advising farmers.

The first demonstration farms in the UK were funded and operated by government after World War Two. Today, a wide variety of organizations and institutions operate demonstration farms and/or organize farm tours for similar purposes. We have already mentioned some.

Agricultural colleges and universities operate demonstration farms that are very similar to what we see in Wisconsin and elsewhere in the US. Following on the tradition of those first government demonstration projects, the emphasis lies primarily on research to demonstrate and quantify the effects of various farming practices and technologies. (Obviously, another goal is to train young adults to enter agricultural professions.) It is not uncommon for UK universities to host open houses or similar events in order to share this research with farmers, but the outreach or extension role is not as central as research and education. Generally speaking, research on university demonstration farms is multi-disciplinary. Many UK institutions are now conducting environmental research, and some of this research is focused on the dairy sector.

One example of this type of demonstration farm is Gelli Aur Farm at Coleg Sir Gar in Wales. This farm is home to a Dairy Development Center that is one of the Farming Connect "Centers of Excellence." Gelli Aur is managed as a profit-making venture, but it is also used as a platform for research, education, and outreach.

A number of research institutions outside of academia have a similar role to the university demonstration farms. One obvious example is the Institute of Grassland and Environmental Research (IGER). With core funding from the Biotechnology and Biological Sciences Research Council and grant funding from Government and others, IGER operates three research farms in Wales and one in England. The farms in Wales are linked to Farming Connect. IGER's research program focuses on sustainable grassland agriculture. Work is divided among three departments, including a Soil, Environmental and Ecological Sciences Department. This large department produces a tremendous amount of environmental research, much of it relevant to dairy farming, on topics such as nutrient cycling, runoff, biodiversity, greenhouse gas emissions, etc. IGER hosts conferences and several open days per year and offers farm tours for large groups. These demonstration farms are not specifically meant to operate as profit-making ventures.

The types of demonstration farms we've described thus far do not differ markedly from what is commonly seen in the US. What is different, some might say radically different, is the number of additional demonstration farms and farm tours coordinated by environmental groups and other non-governmental organizations. We've previously mentioned that FWAG coordinates farm tours and that LEAF supports a network of demonstration farms. The LEAF example is worthy of greater scrutiny.

LEAF coordinates a nationwide network of about 50 volunteer demonstration farms. These are working farms that have adopted IFM and agreed to show other farmers how it can work to their advantage. Many farmers find this type of demonstration activity to be more useful and more credible because they understand that LEAF farms are operated as businesses, that somebody's livelihood is at stake, and that they won't be encouraged to adopt practices that are not realistic or achievable on an ordinary farm. LEAF demonstrations are also tailored toward regional insights into the best local approaches to IFM, so farmers know they won't have to travel across the country and they won't be shown farming methods that don't work under local conditions.

LEAF publishes a catalog describing each of the demonstration farms in the farmers own words. Visits to these farms are organized by LEAF, either upon request for small groups or as part of a scheduled event for larger groups. Visitors are encouraged but not required to become LEAF members. LEAF farms have been especially useful in demonstrating and promoting conservation practices that enhance biodiversity and qualify for government grant funding.

Before moving on to other subjects, we'll conclude this chapter by looking at the Forward Farming project. This project was a deliberate attempt by the UK government to test the effectiveness and value of demonstration farms and associated activity as a strategy for improving the economic and environmental performance of agriculture. The Forward Farming project was managed by a consortium of agricultural colleges under contract to Defra, and it involved three elements of interest to this discussion. First, a network of 22 demonstration farms was established. Second, these farms hosted more than 60 demonstration events in a little over a year. And third, the project managers assessed and evaluated the effectiveness of these events as an outreach tool. Some of the key findings are summarized below:

- demonstration farms were found to be an effective means of encouraging the uptake of sustainable agricultural practices;
- about one-third of farmers who attended demonstration events later reported that they had changed or would change their environmental practices as a result of what they learned; and,
- about one-fourth of attendees indicated that they would seek further advice and training.

Following completion of this project, Defra hired ADAS and Reading University to independently analyze the Forward Farming results and their significance. This separate report concluded that there *would* be benefits to continued Defra involvement in demonstration farm activity, but that a government-funded national network of demonstration farms would *not* be the most effective way to disseminate best practices. The analysis identified the following as essential elements of successful demonstration activity:

- a wide variety of practices should be demonstrated through a wide variety of outreach methods and activities;
- in most cases farms should serve as demonstration sites for just a few years, in order to ensure that they continue to represent typical and ordinary conditions that other farmers will be able to relate to;
- demonstrations should emphasize local issues and local solutions, but in the context of broad national goals and criteria;
- efforts to stimulate the *demand* for demonstrations, in other words to get farmers interested in visiting demonstration farms, are needed more than efforts to increase the *supply* of demonstration activity; and,
- government-funded efforts should be coordinated with the efforts of other organizations providing demonstration activity.

4.0 Economic Incentives and Disincentives

One of the most potent ways to influence farmers and promote improved environmental performance is to directly or indirectly connect environmental results to economic outcomes. Across the EU, member states have adopted a Common Agricultural Policy (CAP) that makes use of monetary incentives and disincentives to drive environmental improvement. In this chapter we will begin with an overview of the CAP, giving particular attention to its application to dairy farms in England and Wales. We will then explain in detail three parts of the CAP that most directly address the environmental impacts of dairy farming throughout England and Wales: the single payment scheme, agri-environment schemes, and organic farming schemes. And finally, the chapter will conclude with a brief discussion of how taxation, lending, and insurance policies can create economic incentives and disincentives for environmental improvement.

4.1 The European Common Agricultural Policy

Agricultural policy has been a focal point for the EU for more than 40 years. The CAP, which currently consumes more than 40% of the total EU budget, is said to be built on two pillars. The first pillar consists of market and income policies that seek to provide an economic advantage for European agricultural products on world markets, while minimizing conflicts potentially arising from intra-European competition. The second pillar is a collection of policies for the sustainable development of rural areas.

After a decade of relative stability, in June 2003 the EU agreed to sweeping reforms of the CAP. It is not an exaggeration to say that these reforms constitute the biggest change to European agriculture in several decades. Although the two pillars of the CAP remain, they have been modified substantially.

A comprehensive treatment of the CAP would be beyond the scope of this report. However, in this section we'll summarize each pillar of the CAP (past and present) as it relates to the UK dairy sector, and try to understand how and why policy has changed and what those changes may mean for environmental performance.

4.1.1 Pillar 1: Market and Income Policies

The driving force behind the original CAP, adopted in 1962, was the need to ensure adequate food supplies at reasonable prices (i.e., food security) in Europe. Policies were designed to promote domestic food production and reduce dependence on imports. Ultimately, these policies were so successful that domestic overproduction became a chronic problem. This created friction among EU member states and between Europe and other countries whose farmers were not as generously subsidized. In response, various reforms to the CAP were introduced over the years to prevent and respond to surplus production.

By the mid-1990s, Pillar 1 of the CAP had evolved to include the following market and income policies with respect to the dairy sector.

- Tariffs on dairy imports from outside the EU – To ensure that cheaper imports could not undercut EU products in the marketplace.

- Export subsidies – To help EU dairy products compete in foreign markets by artificially lowering prices of exported goods.
- Milk production quotas – To ensure that countries within the EU produced at roughly the same level that they consumed, thus preventing competition for market share between EU member states.
- Intervention buying – A price support program to ensure that dairy processors got a minimum price for butter and milk powder, effectively creating a floor for EU milk prices.
- Private storage aid – To help processors store butter and milk powder bought at intervention prices, so these products could be sold when markets became more favorable.
- Product subsidies – Direct EU subsidies to boost EU consumption of a few specific dairy products (e.g. butter used in food manufacture).

By 2000, the CAP budget (for all forms of agriculture, not just dairy) had reached about $40 billion. Nearly 90% of that budget was allocated to Pillar 1 policies. In addition, the CAP imposed an indirect cost on EU consumers because market intervention was raising food costs above what they otherwise would be. The Organisation for Economic Cooperation and Development estimated that this added another $48 billion to the true cost of the CAP in 2000. A consensus grew among EU member states: Pillar 1 policies were extremely expensive and not economically sustainable. Ultimately, the high cost of Pillar 1 policies were the principal driving force behind the 2003 CAP reforms[26].

The 2003 CAP reforms made four key changes to Pillar 1 policies, summarized below.

- Direct Aid Payments – Beginning in 2005, UK farmers are eligible for a new Single Payment Scheme (SPS). Under the SPS, each farmer can receive a "single farm payment" that is decoupled from production; in other words, increasing production will not increase the subsidy check. The SPS is the subject of section 4.2 of this chapter and is described there in detail.
- Modulation – Funds have been transfered out of farm subsidy accounts and into environmental and rural development programs.
- Gradual Reductions in Intervention Prices – The intervention price for butter will be reduced by 25% over four years, while the intervention price for skimmed milk will be reduced 15% over three years. The EU apparently intends to further reduce or ultimately end tariffs and subsidies, but member states have not yet agreed to a plan.
- Financial Discipline – Safeguards have been established to ensure that the total farm budget for the EU is fixed until 2013 and will not be exceeded.

4.1.2 Pillar 2: Sustainable Development of Rural Areas

The CAP has long included funding mechanisms for sustainable rural development and EU member states are all required to have rural development plans. Funding is

[26] There was also significant concern that trade-distorting subsidies could result in costly sanctions by the World Trade Organization, but this had far less influence over the reforms actually taken in 2003.

provided to support these efforts, and in recent years rural development (i.e., Pillar 2) has consumed just over 10% of the total EU CAP budget.

Although Pillar 2 of the CAP covers a wide range of rural development programs, agri-environment schemes have been a focal point.[27] Broadly speaking, the term "agri-environment scheme" applies to policies whereby farmers are paid to voluntarily undertake specific farming practices that protect the environment and natural resources. Reforms to the CAP in 1992 made agri-environment schemes the one mandatory element of each nation's rural development plan. From 2000-2002, these schemes consumed more than a third of EU Pillar 2 funds and enrollment in agri-environment schemes exceeded 25% of all agricultural land in EU member states.

In the UK, the most recent rural development plans were created after changes to the EU rural development regulation in 1999. Because rural development is a devolved matter, each administration created its own plan covering the time period 2000-2006. Each plan includes at least one agri-environment scheme as required, but they differ markedly in the details. The plans also differ in terms of the priority assigned to agri-environment versus other rural development measures. England's plan puts relatively more emphasis on agri-environment than the plans of Northern Ireland, Scotland, and Wales. But to keep this discussion manageable, we will look in detail only at the rural development policies of England and Wales.

The England Rural Development Program (ERDP) for 2000-2006 included ten separate schemes within two broad categories. Some of the schemes existed prior to 2000. UK funds were added to supplement the available CAP funding and the ERDP was projected to spend nearly $3 billion on rural development over seven years.

The first category of schemes included grant aid to help farms, other rural businesses, and rural communities to adapt and develop in response to changing social and economic conditions. This part of the ERDP included the following programs.

- Energy Crops Scheme – To establish energy crops and/or create producer groups to share costs[28].
- Rural Enterprise Scheme – Supports the development or diversification of rural businesses in certain specified categories.
- Processing and Marketing Grants – To develop processing facilities for primary agricultural products.
- Vocational Training Scheme – To improve the occupational skills and competence of rural workers involved in farming, forestry, and diversified enterprises.

The second category of ERDP schemes consisted of the following grant schemes that directly promoted conservation and environmental improvement in rural areas.

[27] Throughout this section, the subject of rural development has been vastly simplified to concentrate on those parts of the rural development agenda that have the greatest impact on sustainable dairy farming.

[28] This scheme potentially has significant environmental benefits, but the primary objective is economic.

- Environmentally Sensitive Areas Scheme – Encourages farmers to adopt prescribed land management practices in specified areas of national importance.
- Countryside Stewardship Scheme – Encourages farmers outside of Environmentally Sensitive Areas to adopt prescribed land management practices targeted to locally identified priorities.
- Organic Farming Scheme – Encourages the expansion of organic production and help farmers convert from conventional production methods (refer to section 4.4 of this chapter for more information).
- Woodland Grant Scheme – Provides incentives for the creation and sustainable management of woodlands and forests.
- Farm Woodland Premium Scheme – Encourages conversion of productive agricultural land to woodlands.
- Hill Farm Allowance – Compensates beef and sheep producers in "less favored areas" for maintaining upland landscapes and rural communities, where agriculture is economically disadvantaged because of altitude, geology, or climate.

Obviously, some of the ERDP schemes were much more relevant to sustainable dairy farming than others.

The Rural Development Plan for Wales 2000-2006 is similar in many ways to the ERDP. The Welsh plan includes an Organic Farming Scheme and a Woodland Grant Scheme that are not identical in every detail to their English counterparts but are geared toward the same objectives. There was also the Hill Livestock Compensatory Allowance, which served a similar purpose to the Hill Farm Allowance in England, i.e., to compensate farmers in disadvantaged agricultural areas.[29]

Voluntary agri-environment schemes had been available prior to 2000 that applied to specific areas of Wales (the Environmentally Sensitive Areas Scheme and Tir Cymen) and to particular habitats in Wales (the Habitat and Moorland Schemes). But in 1999, the Welsh Assembly launched a new program called Tir Gofal to replace these former schemes throughout Wales.[30]

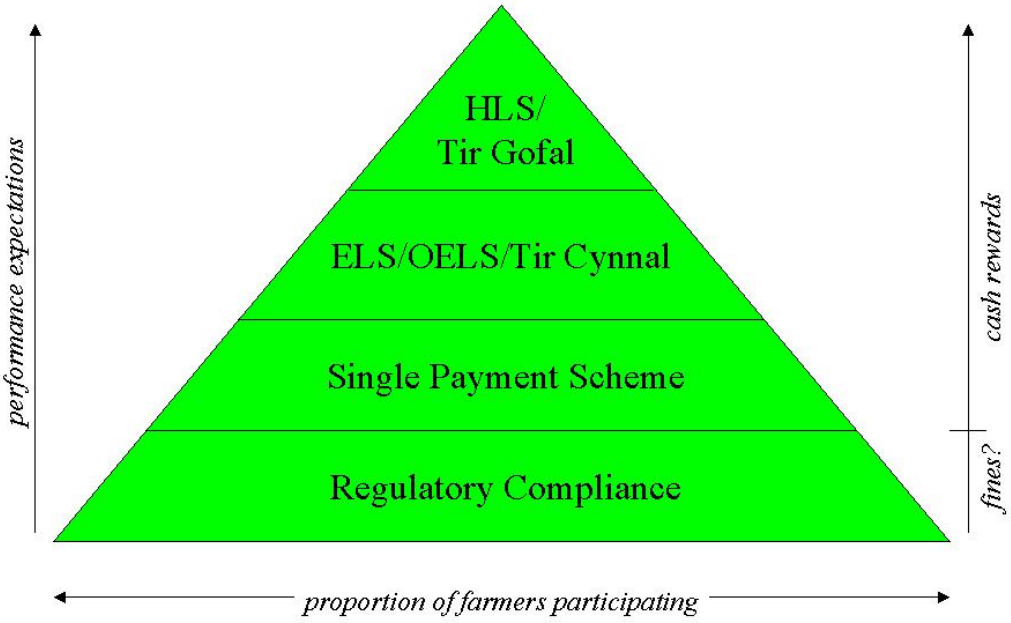
The 2003 CAP reforms had as big an impact on Pillar 2 as they did on Pillar 1. As mentioned previously, Pillar 1 funds were "modulated" and moved into Pillar 2 accounts. In response, a suite of new Environmental Stewardship schemes were launched in England in 2005 to replace the Environmentally Sensitive Areas, Countryside Stewardship and Organic Farming Schemes. In Wales, a new Tir Cynnal agri-environment scheme has been proposed to supplement Tir Gofal. Section 4.3 of this chapter will provide a more thorough treatment of the main English and Welsh agri-environment schemes.

4.1.3 Better Environmental Performance Means More Money

Before going into details about the single payment scheme and the main agri-environment schemes in England and Wales, it may be helpful to begin with an overview looking at the bigger picture. From a typical farmer's perspective, the

[29] The Hill Livestock Compensatory Allowance was replaced by a new Tir Mynydd scheme in 2001.
[30] Agreements under the old schemes last ten years, so some agreements are still active.

economics of environmental policy in England and Wales under the new CAP can be summarized in terms of a pyramid, as shown in the diagram below:



The base of the pyramid consists of compliance with direct environmental regulations, as detailed in Chapter 2 of this report. At this level, the environmental expectations placed on farmers are minimal. Compliance with these regulations is mandatory, however, so this tier includes *all* farmers. Farmers who don't perform to this level may be subject to monetary penalties.

As one progresses higher up the pyramid, each layer represents a *voluntary* program that requires successively higher levels of environmental performance. In addition, the width of each tier of the pyramid symbolically represents the number of farmers participating at that level. The higher the level of performance required, the fewer farmers will be able to participate.

The second layer of the pyramid consists of the SPS. In order to qualify for the single payment, farmers must do more than merely comply with environmental regulations. This tier is not quite as broad as the base because a minority of farmers may choose to forego the SPS program.

Agri-environment schemes fill the third and fourth layers of the pyramid. The Entry Level Stewardship (ELS), Organic Entry Level Stewardship (OELS), and Tir Cynnal schemes allow farmers to earn a modest reward payment for taking environmentally beneficial actions beyond the requirements of the SPS. The Higher Level Stewardship (HLS) and Tir Gofal schemes provide even greater payments but require more significant actions.

4.2 The Single Payment Scheme

Prior to the 2003 CAP reforms, European agriculture was supported by an array of commodity-specific subsidies. Many farmers were eligible for multiple programs and received separate payments for each. Some of the payments were linked to production levels of various agricultural commodities, while others were linked to the amount of land farmed.

With the introduction in 2005 of the SPS, all of those direct payments are now replaced with a simplified single farm payment (SFP) that is completely decoupled from production levels. Instead of tying subsidies to production levels, the SFP amounts are based on historic subsidy levels and/or the amount of land farmed.

In Wales, the SFP amount is determined on an historical basis. Speaking in general terms, what this means is that each farmer in Wales will continue to be eligible to receive an SFP equal to the total value of all the subsidies he or she received prior to the CAP reforms. From the farmer's point of view, the level of potential support is frozen in time and is no longer dependent on production levels.

England's SFP is more complicated because it involves a gradual transition from payments based mostly on historic subsidy levels, as in Wales, to payments based entirely on the amount of land farmed. In the first year of the new regime, 2005, 90% of the SFP will be determined based on historic subsidy levels and 10% based on the area of land farmed. Each year, the mix changes until in 2012 the SFP will be based entirely on the number of hectares on the farm. Farmers in England may ultimately see their total amount of subsidy increase or decrease because of this decision to base the SFP on area farmed. For example, a farmer who manages a relatively small farm intensively might have received large subsidies in the past, because subsidies were coupled to production. In the future this farmer's subsidy will be based entirely on the small land area farmed, and he or she could see a reduction in total subsidy. The converse could also happen, where a large farm that did not have very high historic production levels (or subsidies) could see an increase in subsidy with the transition to an area basis.

In both England and Wales, and in fact throughout the EU, the new SFP comes with a very big catch, called cross-compliance. Under cross-compliance, eligibility for SFP payments is dependent upon conformance to a wide range of standards, covering environmental protection, human health, animal health and welfare, and plant health. UK farmers will only receive the full SFP amount for which they are eligible if they comply with specified Statutory Management Requirements (SMR) and if they maintain their farm in Good Agricultural and Environmental Condition (GAEC). The specifics of the regulations vary across the four countries of the UK. Initially, there are 8 SMRs and 17 GAEC standards included in the cross-compliance regime in England, and 9 SMRs and 13 GAEC requirements in Wales. More will be added in the coming years. In England, the topics initially covered by the SMRs are as follows:

- wild birds;
- groundwater;
- sewage sludge;
- nitrate vulnerable zones;
- habitats; and,
- animal identification and registration (3 separate statutes).

The initial GAEC standards in England address the following issues:

- general requirements;
- post-harvest management of combinable crops;
- waterlogged soil;
- burning of crop residues;
- environmental impact assessment;
- sites of special scientific interest;
- ancient monuments;
- public rights of way;
- overgrazing and unsuitable supplementary feeding;
- heather and grass burning;
- control of weeds;
- eligible land which is not in agricultural production;
- stone walls;
- protection of hedgerows and watercourses;
- hedgerows (additional standard to above);
- felling of trees; and,
- tree preservation orders.

Any farmer who fails to comply with an SMR or GAEC standard will see a deduction taken from their SFP.[31] However, it is important to keep in mind that cross-compliance is not a traditional "command and control" (direct regulation) program. Cross-compliance is the price each farmer now must pay if they want to receive government subsidy payments. Any farmer could choose to forego those payments and ignore the GAEC standards of cross-compliance.[32] A small minority of farmers will undoubtedly do just that, but the vast majority of farmers are expected to enter into the SPS and strive to obtain their full SFP by meeting cross-compliance requirements.

One final point about implementation should be mentioned. Because it spans a variety of issues and does not fit within the regulatory authority of any one government entity, cross-compliance will be managed as a team effort. In England and Wales, the Environment Agency, the Rural Payments Agency, and other organizations are developing interagency agreements that will spell out mutual expectations about inspection procedures, workload, etc. Cross-compliance will add substantially to the workload of Environment Agency field staff. To those employees and to the farmers

[31] Government officials were working on a "penalties matrix" at the time this report was completed. The penalties matrix will spell out how much of the SFP is deducted in each circumstance. Initial indications are that unintentional non-compliance with a single cross-compliance condition could cost the farmer 1-5% of their SFP, while a serious intentional non-compliance could lead to no SFP at all.

[32] An SMR is different. Because it is a statutory requirement, each SMR must be met by all farmers to which the regulation applies. Any farmer who violates an SMR may be subject to regulatory enforcement and fines. If they are in the SPS, such fines would be separate from and in addition to any deductions from their SFP. Another important distinction is that it is easier for government to reduce an SFP than it is to secure a statutory conviction. The burden of proof required for a conviction in the UK is "proof beyond reasonable doubt." Because cross-compliance is a voluntary program, the burden of proof for reducing an SFP is lower. Government need only demonstrate in court that the "balance of probability" supports a decision.

they visit, it will look and feel very much like a direct regulatory program, even though technically it is not.

The new SPS has a number of profound implications for the UK. It transforms the old CAP subsidy programs into a powerful new incentive program for sustainable agricultural development. Some have described this change as a transition from product support to producer support. Because of cross-compliance farmers will now effectively be paid to manage and protect land, water, and biodiversity on behalf of society. In addition, overproduction, which is sometimes a factor in environmental degradation, should become far less common. This reduction in supply could lead to a rise in prices that will benefit some farmers, not just in the EU but in the developing world. Lastly, and perhaps most importantly, UK farmers will have more freedom to farm as they choose. It will now be far easier for them to adjust what they produce and how much they produce in response to changes in market demand, without considering the complicated calculus of the old subsidy programs.

4.3 Agri-Environment Schemes

The purpose of agri-environment schemes is to encourage farm practices that protect natural resources, reduce pollution, promote biodiversity, and preserve historic sites by providing economic incentives. The schemes are funded in part by modulation and in part by direct funding from the UK treasury.[33]

Agri-environment schemes were created in part to reverse some of the long term unintended consequences of earlier agricultural policies. Following World War II, the UK aggressively promoted policies to maximize agricultural production. As a result, the majority of farms were transformed from being mixed livestock and crop farms to specializing in a single crop or animal. Yields increased, but so did inputs (fertilizer, energy, etc.). And monoculture farms led almost inevitably to a substantial decrease in biodiversity, and in some cases to the loss of historic sites, diminished public access, and fragmented landscapes. These trends probably peaked in the 1970s.

In the late 1980s, the UK government began to tackle these problems by offering the first generation of agri-environment schemes. Governments in England and Wales both offered an Environmentally Sensitive Areas Scheme targeted at a small number of localities of national importance. Outside of those areas, England offered a Countryside Stewardship Scheme and Wales offered a scheme called Tir Cymen. All of these programs were voluntary and competitive, in the sense that the program conferred no entitlement and farmers only received funding if government accepted them into the programs. Farmers were competing with each other for limited funds and only the top competitors were awarded grants.

With these schemes, farmers that adopted certain practices were paid an amount that was intended to offset 50-100% of the income typically lost when that practice is adopted. Because of the way typical losses were estimated, some farms were undoubtedly paid more than the actual amount of income lost but some were certainly

[33] As mentioned earlier in this chapter, modulation is the term used when a government holds back a small portion of their Pillar 1 CAP money, and moves those funds into Pillar 2 to support rural development programs.

paid less. The specified practices were intended to protect special areas or habitats and/or address high priority environmental issues.

Governmental authorities reviewed these original agri-environment schemes a few years ago and several important lessons were noted. One lesson is that offsetting lost income is an inexact and inadequate incentive for participation. Another key lesson is that dairy farmers were virtually excluded from the programs. This was an unintentional outcome. The targets that government set as participation requirements proved to be unexpectedly difficult for dairy farms to achieve, and as a result they took no interest in the programs or had trouble competing with other types of farms. A third lesson is that these stewardship programs were too complicated for many farmers, and/or required too much government interaction to implement.

The design of the schemes currently available in England and Wales reflects these lessons. Most notably, both England and Wales have created a two-tiered approach to agri-environment. The lower tier is a "broad and shallow" scheme that is available to virtually all farmers and requires minimal governmental oversight. This tier is intended to attract large numbers of farmers by offering small payments for relatively small and simple voluntary efforts. The higher tier programs are more similar to the old programs (Countryside Stewardship and Tir Cymen) in that they aim to achieve specific improvements in high priority situations and areas. Each of the new agri-environment schemes is summarized below.

4.3.1 ELS

Under ELS, farmers in England make five-year commitments to specific farm practices and in return they receive a payment from government. To be eligible for ELS, a farmer must first have all of his or her land registered with the Rural Payments Agency. Most will have already done so in order to obtain their SFP. The second mandatory requirement is that the farmer must complete a Farm Environment Record, which entails marking up a map of the farm to indicate certain environmental and historic features. Land which is already enrolled in an agreement under the old Pillar 2 schemes (e.g. Countryside Stewardship or Environmentally Sensitive Areas) is not eligible for ELS until the previous agreement expires.

The essence of the ELS is a point system. Farmers can choose from about 50 different optional practices, each of which earns a specified number of points. For example, a nutrient management plan for the whole farm earns 2 points for each hectare of registered farmland, while protecting trees in arable fields earns 12 points per tree protected. In most cases, the farmer's goal is to reach a point total that equals their number of hectares of registered farmland, times 30. In certain "less favored areas" the target is just 8 points per hectare. The farmer then marks the options selected on their Farm Environment Record, returns the paperwork to Defra, and commits to those management practices for 5 years. Participating farmers in less favored areas are paid £8/ha/year in two semi-annual payments. Everywhere else they are paid £30/ha/year.[34]

[34] We have previously noted that the SPS is a voluntary program that will look and feel like a regulatory program to many farmers. ELS shouldn't have that problem. At this point government is not planning a high level of oversight or compliance monitoring, but there are penalties for fraud or failure to implement commitments.

The design of ELS reflects the lessons of the old Countryside Stewardship Scheme. ELS is meant to be simple, easy to qualify for, easy to apply for, and easy to administer. Most of the ELS options truly are simple to understand and there are options available that make sense for all types of farms. Some of the options are targeted to protection of historic and cultural resources, others will promote biodiversity benefits, some will reduce non-point pollution, and some have multiple benefits. A key feature is this combination of socially desirable outcomes under a single program. Defra selected the list of options and crafted the point system with a view toward encouraging widespread participation that will lead, collectively, to substantial benefits of general interest to all of England. More specific or locally significant environmental problems will be addressed through the HLS program, described later in this chapter.

Government officially launched ELS on March 3, 2005. Defra, Environment Agency, and numerous other parties are going to great lengths to promote ELS. Defra sent a description of the program to every farmer in England and hosted workshops around the country where farmers could learn more and ask questions.

Defra have stated that they hope roughly 80% of farms in England will participate in ELS. The fear is that participation rates will be lower, perhaps 50%, among dairy farms. This is a legacy of the fact that the specific procedures of the old Countryside Stewardship Scheme unintentionally put dairy farms at a disadvantage, and many dairy farmers may have developed a notion that stewardship schemes aren't for them. This is a serious concern for dairy sector stakeholders. As we will see in chapter 6 of this report, the Environment Agency collaborated with dairy stakeholders to develop an ELS promotional leaflet specifically for dairy farmers, hoping to encourage participation beyond the expected 50% rate and closer to the 80% expected of other types of farms. Other organizations have also targeted the dairy sector for special attention in their ELS outreach activities.

Of course, given that ELS has only recently been launched, it is impossible to say whether it will achieve the desired results. Results from the first enrollment period, which had a May 31 deadline, may provide an early indication of whether the 80% enrollment target can be achieved. But it will be years before an assessment of the environmental impacts of the program can be made. We will have to monitor the program as it matures.

4.3.2 OELS

OELS is the agri-environment scheme in England for farmers who manage their land organically. The organically managed land must be registered with a recognized organic inspection body as fully organic or in conversion to organic. In most respects, OELS is essentially the same as ELS. The key differences are as follows:

- some of the points options available under ELS are not available under OELS because they are not appropriate for organic production;
- the points target for qualification is 60 times the number of organic hectares, but 30 points are granted automatically in recognition of the environmental benefits of organic production;

- the payment is £60/ha/year for each hectare of organic land; and,
- organic land in less favored areas is not eligible for OELS but is eligible for ELS.

In cases where farms have a mixture of conventional and organic land, the organic land would have to meet OELS eligibility rules and the conventional land would have to meet ELS rules. It is not possible to use surplus points from the conventional land to meet the target for the organic land, or vice versa. Each must qualify separately. A single OELS agreement will cover everything and will be based on £60/organic ha/year + £30/conventional ha/year.

4.3.3 Tir Cynnal

Tir Cynnal will be the "broad and shallow" agri-environment scheme for Wales.[35] Its aim and purposes are similar to those for ELS in England, but the program itself is entirely different.

Like ELS, Tir Cynnal is a whole farm scheme available to nearly every farmer in Wales. Farms smaller than 3 hectares are not eligible, nor is land that is already enrolled in another agri-environmental agreement under earlier schemes. The goals of Tir Cynnal are to prevent loss of biodiversity, protect landscapes, safeguard historic features, and reduce pollution. In return for undertaking relatively simple actions and signing a 5-year agreement, a farmer can receive a modest payment.

The payment levels for Tir Cynnal are more complicated than they are for ELS. The reason for this complication is that policy makers in Wales deliberately chose to help small farms the most. They did this by creating a graduated payment schedule. Farmers who qualify for Tir Cynnal earn £45/ha/year for their first 20 hectares, £30/ha for the next 30 hectares, £25/ha for the next 50 hectares, and £5/ha for the next 100 hectares. Above a total of 200 hectares, eligibility requirements still apply because Tir Cynnal is a whole-farm scheme, but no additional compensation is available. For example, a 250 hectare farm could earn £3550/year: (20 ha * £45) + (30 ha * £30) + (50 ha * £25) + (100 ha * £5) + (50 ha * £0) = £3550.

Tir Cynnal is completely different from ELS in that it does not use a points system to determine eligibility. Instead, there are uniform requirements that all participating farms must meet. These are summarized below.

- Farm map – Participating farmers must prepare a map of their farm that identifies areas of wildlife habitat, traditional field boundaries, historic and archaeological features, traditional farm buildings, and water features.
- Whole farm requirements – Tir Cynnal specifies a wide variety of mandatory requirements covering various aspects and features of the farm. There are nearly 30 different requirements specific to field boundaries, trees, historic features, landscape features, solid waste, soils, water, exotic species, animal welfare, and

[35] As of the time this report was written, Tir Cynnal had not yet been approved by the European Commission and thus was not yet available to farmers in Wales. Accordingly, many of the details of the scheme have been omitted from this description. I have tried to stick to the fundamentals of the scheme, which are unlikely to change in any major way. Even so, it is possible that the final approved program may differ in some respects from what is presented here.

public access. The following examples are offered simply to suggest the scope and depth of these requirements:
    - retain all traditional field boundaries (e.g., hedgerows and stone walls);
    - retain dead trees in most cases and follow guidelines for bats in trees;
    - keep the farm clear of garbage and avoid dumping appliances, vehicles, etc. on the farm; and,
    - avoid spreading manure or slurry within 10 meters of a water feature.
- Safeguards for wildlife habitats – The scheme defines land with certain characteristics as wildlife habitat. In any area classified as wildlife habitat, participating farmers must refrain from a wide range of activities that could damage the habitat or harm wildlife. For example, there are prescriptions against cultivating wildlife habitat, applying fertilizers, overgrazing, using pesticides, etc.
- The 5% rule – At least 5% of the land covered under any Tir Cynnal agreement must be classified as wildlife habitat and protected accordingly. If necessary, this requirement can be met by managing improved land in specified ways that will make it more suitable as wildlife habitat.
- Farm resource management plan – Within 6 months of signing a Tir Cynnal agreement, the farmer must draw up a farm resource management plan. The purpose of the plan is to identify environmental aspects and impacts of current farming practices with respect to soils, water quality, and air pollution. The plan will also identify whether a manure management plan or crop nutrient plan is needed and identify practical actions that could lead to improved environmental performance. These plans must be updated annually. The process is not entirely dissimilar to developing an environmental management system, which is discussed in Chapter 5 of this report.

It should be evident that Tir Cynnal is markedly different from ELS. As these schemes mature, it could be very informative to see what results each approach yields.

4.3.4 HLS

HLS is intended to support more complex and expensive forms of sustainable agricultural management. Unlike ELS and OELS, this scheme can provide payments for capital improvement projects.

Like its predecessor Countryside Stewardship, HLS will be targeted to achieve progress in the highest priority ecosystems in England and/or on the highest priority environmental challenges. “Targeting statements” are in fact the strategic underpinning of HLS. Each region of England will have its own targeting statement that describes the outcomes most needed or desired in that region. For example, in a region where soil erosion is a bad problem, the targeting statement might identify soil protection as a top priority. In another region, soil protection might not figure as importantly but habitat for an endangered species could be paramount.

In nearly all circumstances, HLS will be open only to farmers who are already enrolled in ELS or OELS. Interested farmers must develop a Farm Environment Plan which identifies the environmental features on their farm and their current condition. Using this plan, they then choose from a long list of very specific HLS options tailored to those environmental features. Each option earns a different payment

amount. Next, the farmer submits an HLS application to the Rural Development Service (RDS).

Farmers who apply for HLS are paid a minimum of £395 for developing their Farm Environment Plan, but they won't necessarily be accepted into HLS. Each application is assessed for how well it addresses the relevant targeting statement and how cost effective it is in delivering the desired outcomes. If the application is a strong one, an RDS adviser will consult with the farmer and an HLS agreement will be developed. The agreement will specify what the farmer will do and what he/she will be paid. Total payments will generally be much higher for HLS than ELS.

HLS agreements normally last 10 years, but there is a clause allowing farmers to opt out after just 5 years. Payments come twice each year. Performance indicators tailored to each agreement will be monitored throughout the life of the agreement to see how successful it is in delivering the desired outcomes.

At this point it is difficult to predict whether HLS will generate more participation by dairy farmers than Countryside Stewardship did. Most observers expect it will. The targeting statements, which were being reconsidered and debated at the time this report was written, could be the determining factor.

4.3.5 Tir Gofal

Tir Gofal is a whole farm agri-environment scheme which has been available throughout Wales since April 1999, when it replaced the earlier Tir Cymen scheme. Tir Gofal aims to encourage agricultural practices which will protect and enhance landscapes, cultural features, and habitat for wildlife. Any farm of at least 3 hectares in Wales can apply.

Tir Gofal is like HLS in several important aspects:

- farmers choose among many potential management options for protecting and enhancing wildlife, landscapes, archaeological/historic features, or public access;
- capital improvements are eligible for funding;
- funding is limited and only those applications that deliver the best value for money are selected;
- agreements last 10 years with a break clause after just 5 years; and,
- results are monitored on an ongoing basis and assessed against objectives.

The eligibility requirements for Tir Gofal begin with essentially the same whole farm requirements and safeguards for wildlife habitats as Tir Cynnal. But from that point on, the scheme begins to more closely resemble HLS. An interested farmer must submit a farm map with their Tir Gofal application form. The form asks for information about the farm (e.g. stocking rates) and about habitats on the property. The farmer must mark on the map the areas where they would undertake any management options they have selected. Each farm feature and each management option earns points based on a scoring system, and 100 or more points are needed to qualify for Tir Gofal.

Payments under Tir Gofal are as complicated as the scoring system. Participating farmers earn an annual payment that is calculated based on how much land is in various types of habitat, and which management options are undertaken. Fixed one-time payments for specific types of capital improvements are also possible.

4.4 Organic Farming Schemes

Food bearing an organic label is generally more widely available in the UK than it is in the US. Even large, chain convenience stores may be found to be selling organic products. The premium (i.e., price difference between organic products and comparable conventional products) is for the most part less than in the US as well. This may be a direct result of government support for organic production and the resulting growth of this subsector of the agricultural industries, as we will explain.

For more than a decade, the UK has offered financial assistance to farmers to encourage conversion of conventional farmland to organic production methods. Beginning in 1994, the Organic Aid Scheme (OAS) offered flat rates for conversion of all land types. This was initially a very modest program, with only £261,000 spent in England in the grant year of 1995-1996. Over the first 5 years, only 400 participants entered the scheme in England. As a result, the OAS for England was reviewed in 1998 and a new and improved Organic Farming Scheme (OFS) was launched in 1999.

The OFS had a much larger budget than OAS and offered significantly higher rates of aid to individual farmers.[36] As a result, applications jumped almost immediately to over 1200, and in 1999-2000 spending on OFS jumped by more than a factor of 10 to over £12 million. The Government found itself in the awkward position of having to close the scheme to new applications after just four months. Fortunately, 2000 was also the year England and Wales produced new rural development plans covering the years 2000 to 2006. These plans provided the impetus for increasing the funding available for OFS to over £20 million per year.

Many authorities believe that the UK organic industry has matured and grown to the point where government should no longer provide incentives for conversion. Organic milk production in the UK, for example, is generally thought to exceed demand. Any increase in organic milk will only serve to further suppress the prices farmers receive. Organic milk has even been sold as conventional milk, because dairy farmers would rather lose a little revenue in the short term than jeopardize their organic premium over the longer term.

Not surprisingly, given these considerations, the CAP reforms of 2003 turned out to be the beginning of the end for OFS in England. OELS, which was described above, will eventually replace OFS. Land covered by an OFS agreement is not eligible for OELS until the OFS agreement has expired. At that time, the farmer may apply for OELS provided he or she can meet the eligibility requirements. OELS does allow for "top-up" payments for converting conventional land to organic. But in these cases the

[36] Farmers could receive £450/ha for land eligible for arable crop subsidies, £350/ha for other improved land, and £50/ha for unimproved land. The payments covered the period of conversion to organic production and were spread out over a five year period.

conversion payments are lower than they were under OFS and the farmer can only qualify for the conversion payment if they are enrolling their whole farm in OELS.

All of these incentives for organic farming suggest pretty clearly that UK governments are more willing than American governments to endorse the idea that organic production is better for the environment and more sustainable than conventional agriculture. Aside from the obvious arguments about reducing inorganic inputs like fertilizers and pesticides, this position is also bolstered by UK research documenting the biodiversity benefits of organic farming. Even so, officials in the UK are quick to point out that organic farming is not a cure-all for environmental problems, that it may pose its own unique environmental challenges, and that management of the farm (whether organic or conventional) is the most important factor in environmental performance.

4.5 Taxes, Banking and Insurance

We conclude this chapter with a very brief look at three subjects that hold enormous potential for influencing the environmental performance of dairy farming. I had hoped to find interesting developments in the areas of taxation, banking and insurance. Unfortunately I found very little.

Tax policy is a well known tool for influencing behavior, and a favorite of American policy makers. According to sources interviewed for this report, the UK government does not plan to use taxation policy in any meaningful way to promote sustainable dairy farming. Tax breaks for production of renewable biofuels have not been as successful as hoped, and policy makers are not inclined to do more.

Banks can encourage sustainable agriculture through their lending and debt service policies. But as in the US, UK banks are following a fairly conventional approach. Clearly, farms that comply with regulations and participate in agri-environment schemes can potentially enjoy more consistent and predictable revenue streams. UK banks, however, are loathe to take on the kind of appraisal and assessment work that would be necessary to predict in advance which farms are best prepared to meet cross-compliance requirements or qualify for voluntary schemes. Having said that, the traditional lending approach does consider the farmer's ability to service any debt. A farmer who doesn't even apply for the single payment scheme is clearly going to have less income than one who does, all else being equal. We may also find over time that banks become more aware of and take into consideration a farmer's track record with respect to cross compliance and single farm payments.

Insurance is another area ripe for influencing farmer behavior, and here we may be seeing slightly more progress. Some insurance companies are basing decisions in part on environmental risks. For example, one insurer I spoke with explained that they look favorably upon farms that participate in certain crop and livestock assurance schemes. These schemes focus mostly on food safety, but also include some environmental considerations (see chapter 6). Farms that participate in recognized schemes have a better chance of qualifying for reduced premiums.

5.0 Environmental Management Systems

Over the last decade, the EMS concept has become common throughout the world. It is in large part an extension of earlier efforts by manufacturers to develop management systems for ensuring product quality. The essence of either type of management system is to put in place a structure for continual improvement of an organization. Some organizations will do so informally, but many others have chosen to conform to internationally recognized standards. The two standards for EMS that are widely recognized are called ISO 14001 and the Eco-Management and Audit Scheme (EMAS). These standards were developed primarily by the world business community as a means of promoting uniform global standards for proactive environmental management. In each case, there are formal processes for auditing the EMS and certifying that it conforms to the published standard. Companies that certify their EMS are in a position to make claims about their environmental management that may have value to their customers, their shareholders, or governments.

In developing an EMS, an organization will assess the aspects of its operations, products, or services that potentially lead to negative *or positive* environmental impacts. It will then establish environmental objectives and targets, implement programs designed to achieve the objectives and ensure compliance with legal requirements, and monitor the effectiveness of these programs. The system is reviewed periodically with an eye toward continual improvement.

Environmental regulatory bodies around the world have watched the evolution of the EMS concept with interest. EMS is seen as a potent tool for encouraging voluntary self-monitoring and improvement of environmental performance. Governments have debated, experimented with, and implemented many different types of policies designed to encourage widespread adoption of EMS. In most of the world, these efforts focused initially on the manufacturing industries, but efforts have increasingly looked at agriculture as potentially fertile ground for EMS.

Many people think agriculture is ideally suited for EMS because agricultural productivity is so closely tied to and dependent on environmental factors. In addition, it can be argued that agriculture is by its very nature a type of management system, and implementing an EMS simply influences the list of desired outcomes.

In this chapter we will look at policies in England and Wales that encourage the dairy sector to adopt EMS as a tool for performance improvement. We will do this by first looking at a policy initiative directed toward agricultural producers (i.e., farmers), and then looking at a policy that affects dairy processors rather than producers. By comparing these two dissimilar efforts to each other and to comparable efforts elsewhere, we will lay the foundation for policy recommendations related to EMS.

5.1 EMSF/Whole Farm Appraisal

The Environmental Management System for Farms (EMSF) is being developed by the Environment Agency in partnership with Defra and the major farmers' unions of England and Wales. It is a critical component of IRAP, described in Chapter 2. The purpose of EMSF is to:

- educate and inform farmers;
- encourage self-auditing and benchmarking to promote a better understanding of a farmer's environmental performance relative to best practice;
- promote sustainable agricultural practices of benefit to both land and water; and,
- allow farmers to re-evaluate their farming practices and reap both the economic and environmental benefits of sustainable agriculture.

Before going any further we should clarify that EMSF is not, in its current form, a formal EMS as defined above per ISO 14001 or EMAS. Rather, it is an information technology system that helps farmers with environmental management. Although it is not a true EMS, without question it could become an extremely valuable tool for farmers interested in a formal EMS. It is thus worthy of further consideration in this chapter, though it just as easily could have been placed in the education and advice chapter of this report.

Several years ago the Environment Agency gave careful consideration to promoting formal environmental management systems (e.g., ISO 14001) on farms. The Agency concluded that farmers would find EMS too unfamiliar or intimidating. Instead, a decision was made to build a tool that is essentially an environmental *information* management system. The advantage of this approach is that it allows farmers to audit and benchmark their performance and gain valuable information about good practices, *using a tool that can automatically submit required reports, applications, and other regulatory paperwork to Defra, the Environment Agency, or other officials*.

In some ways EMSF is comparable in function to Wisconsin's Permit Primer. The self-audit portion of EMSF consists of a questionnaire. The farmer's answers to these questions will identify regulatory requirements, but the system also links to helpful context-sensitive information about good practices. What's *really* interesting, though, is that EMSF has been linked to, and to a certain extent subsumed by, something even bigger: the Whole Farm Appraisal (WFA).

Defra routinely interacts with an estimated 100,000 farmers and has seen the need to move toward greater use of electronic transactions. WFA is Defra's first gigantic step in this direction. WFA is a means for farmers and Defra to electronically exchange information that goes well beyond the scope of EMSF. In addition to environmental information, the WFA will look at health and safety issues, subsidy payments, and more. One goal is for the WFA to become the main system for collecting and processing cross-compliance information necessary to operate the Single Payment Scheme (refer to Chapter 4).

Defra and the Environment Agency assert that the linking of EMSF and WFA will generate the following key benefits for farmers:

- save them from filling in repeated requests for the same information;
- ease reporting and data collection processes;
- enable them to check the information in government systems for accuracy;
- provide them with instant access to current guidance and help;
- identify applicable regulations and understand why they exist;

- allow them to use the data for business planning, farm assurance and/or environmental audit purposes;
- enable them to provide evidence of good practices which will reduce the risk of being selected for inspection; and,
- automate the process for issuing certain exemptions and licences.

The vision for EMSF is obviously ambitious, so the Environment Agency consciously decided to develop EMSF in a modular approach. Nearly every module is (or will be) based on farm activities as seen from the farmer's perspective, not the regulator's perspective. This should make the tool more accessible to farmers and less intimidating. Each module consists of a self-audit questionnaire, with guidance and reference material built in or available through links. Through the connection to the WFA, modules can be pre-populated with farm-specific data from a range of Defra databases and can be used to generate and submit various reports and applications to Defra. Defra's system will then pass along information to other authorities' systems as needed.

Three EMSF modules were included in compact disks that were sent to farmers to pilot test the WFA in summer 2004. Later in the year and into early 2005, farmers were asked to pilot test an Internet-based version of the self-assessment tool with links to guidance on good practices. The modules included in these pilot tests were Baseline (covering general information about the farm), Crop Protection (which covers pesticides)[37], and Nutrient Management/Spreading. Feedback thus far has been fairly good, suggesting that no wholesale changes are needed but format improvements are desirable. The number of farmers who have been involved in pilot testing is in the hundreds.

A complete Waste Management module has since been developed and pilot testing was recently completed. Two other modules have been drafted, but await links to web-based guidance on best practices. The first covers Use and Disposal of Sheep Treatment Compounds and Flock Management, and the second module covers Forage Conservation/Silage.

In addition to the above, progress has been made on a module covering the spreading of sewage sludge, but pending changes to the relevant regulations have put this module on hold. A water use module is also under consideration. The entire EMSF project is now under review to examine options for taking it forward. Testing of the newer EMSF modules is needed, as is the means of delivering EMSF and the WFA in Wales.

Defra plan a limited launch of the WFA, including EMSF modules, in England in September 2005. They will use interim data systems to collect data until a contractor can build and test the permanent databases that will receive WFA data. The Environment Agency faces similar challenges. Simple Microsoft Access tables will be used to hold the EMSF data passed along from Defra until the Agency's new Integrated Site Database is completed, probably in 2006.[38]

[37] The EMSF Crop Protection module is very closely linked to the Crop Protection Management Plan that is described in more detail in the Pesticides Voluntary Initiative section of Chapter 6 of this report.
[38] As explained in the IRAP section of Chapter 2, the Environment Agency plans to use data from the Integrated Site Database to target inspections based on risk and to pre-populate inspection forms.

5.2 EMS in the Dairy Supply Chain

This report has thus far focused almost exclusively on dairy farms (i.e., dairy producers), but it is important and illustrative on the subject of EMS to look at what's happening in the dairy supply chain. In the UK, the following dairy *processors* have achieved ISO 14001 certification for at least one facility:

- Dairy Crest;
- Dan Dairies Ltd;
- Dairy Produce Packers;
- Dromona Quality Foods;
- Glanbia Cheese Ltd;
- Leckpatrick Dairies Ltd; and,
- Robert Wiseman Dairies.

Several of these companies have registered multiple sites, and there are other companies (e.g., Arla and Dairy Farmers of Britain) and sites that are far along in the registration process, if not already registered. Robert Wiseman Dairies were the first in this industry to register *all* of their UK production and distribution facilities to the ISO 14001 standard, but others are following their lead. This is extremely significant, because Dairy Crest, Glanbia, Robert Wiseman, Arla, and Dairy Farmers of Britain are some of the very largest dairy processors in the UK. Glanbia has even expanded to the United States.

So what is happening here? Why are dairy processors embracing EMS? Industry representatives point to four key factors. First the dairy processors are getting pressure from their most important customers, the large supermarket chains. Supermarkets are expressing a preference to purchase dairy products from processors who have an EMS, but have not openly demanded this as of yet. The second factor is pressure from another source: shareholders and the public. Dairy processors, like other businesses, are under pressure to publish sustainability or "triple bottom line" reports, and some of them think an EMS can form the foundation for a good report. The third factor is cost savings. Some of the processors, particularly Robert Wiseman Dairies, have been outspoken about how their EMS has reduced costs and made them more efficient, particularly through energy savings.

The fourth key factor is particularly relevant to the subject at hand. Companies that have an EMS score better on the Environment Agency's Operator and Pollution Risk Appraisal (OPRA). OPRA is a complicated and clever system developed by the Environment Agency in 2003 for scoring businesses based on their actual environmental performance as well as the risks they pose to the environment. Dairy processors and other businesses covered by Pollution Prevention and Control regulations or Waste Management Licensing regulations must pay the Environment Agency an application fee as well as annual subsistence fees based on their OPRA score.[39]

[39] NB: The risk-based approach to farms that is part of IRAP is based on the same principles as OPRA.

Without getting bogged down in the details, here's how it works. A company's OPRA score is based on five different attributes: complexity, emissions, location, operator performance, and compliance rating. For each attribute, a complicated system is used to assign the company to one of five bands from A through E. The Agency then uses a formula to convert these banded ratings into a final numeric score that is used for charging fees.

The operator performance attribute is extremely closely tied to EMS. Companies that have an EMS will score much better on this attribute than companies without an EMS. Even greater weight is given if the EMS is certified to the EMAS or ISO 14001 standard, and it is also easier to complete the application form. Ultimately, the difference between scoring A (lowest risk) on operator performance and scoring E (highest risk) will be £11,505 in charges for a new permit (or £3,185 for a permit modification) and £5,590 *per year* for the annual subsistence charge.

Clearly the dairy producers that have implemented an EMS can expect to save a little money on their environmental fees, but nobody suggests that this alone makes the difference. Rather, it adds one more reason to the list of reasons for a dairy processor to develop an EMS. These companies are faced with very important and challenging food safety laws, environmental regulations, voluntary assured food standards, and quality demands. They also operate within an extremely tight and competitive business climate, where any opportunity to save a bit of money cannot be overlooked. EMS is a way to tackle multiple objectives systematically, and it is no surprise that several companies have seen fit to do so. We are reminded that the EMS concept was originally developed by the business community for the business community, and it has more to do with management than with environmentalism. Although some businesses find intrinsic value in an EMS and need no encouragement, incentives, or assistance to develop one, we conclude that policies which do provide incentives may sometimes tip the scales and induce action.

6.0 Negotiated or Voluntary Agreements

Voluntary agreements are perhaps the most difficult and time consuming, but potentially powerful, of the collaborative approaches to sustainability. In this chapter we will look at two environmental agreements between UK public bodies and the private sector. One is still being negotiated and the other is well into the implementation phase. We will also look at a sampling of farm assurance schemes, labels, and environmental brands. These are not negotiated agreements per se but do involve voluntary written commitments made by dairy farmers and other parties.

6.1 Dairy Sector Plan

Sector Plans are one of the Environment Agency's new "modern regulation" approaches to environmental improvement. The stated purpose is to:

- focus on the most significant environmental risks and impacts that a sector poses;
- deliver improvements in the sector's environmental management and performance;
- prioritize and target Agency effort within and across sectors;
- achieve, through cooperation with sectors, environmental benefits beyond those which can be achieved through regulation; and,
- monitor progress in delivering environmental improvements, within and between sectors.

A Dairy Sector Plan is likely to be one of the first sector plans completed by the Environment Agency. It will consist of:

- a concise description of the dairy sector in England and Wales in the context of sustainability, including economic and social considerations as well as environmental aspects and impacts;
- a list of objectives for the dairy sector;
- a set of key performance indicators that will be monitored to determine if the objectives are being met;
- a work plan, identifying the program of measures to be taken, the responsible parties, and milestones; and,
- references to various communications tools that will be used to promote and implement certain measures and report on progress.[40]

The arguments for creating sector plans are not dissimilar to the arguments made in Wisconsin for appointing sector specialists. To begin with, the sector plan becomes a focal point for looking at the dairy sector across traditional media-based regulatory boundaries, much as the sector specialist serves as a single point of contact. Cross-media impacts and issues become more apparent and are addressed by staff who take a holistic view toward the sector's environmental performance, including its positive contributions. Without the sector plan, it is unlikely that a discussion of methane

[40] It is interesting to note that the core elements of the plan are essentially a scaled-down version of many of the elements of an EMS (refer to Chapter 5).

emissions, for example, will ever be on the same agenda as a discussion of pesticides or biodiversity.

The role of stakeholders also argues strongly in favor of sector plans. The sector plan approach allows the Environment Agency to engage dairy sector stakeholders on a host of issues relevant to the sector, simultaneously. This rarely happens with public consultation on command and control regulations. And just as Wisconsin's cooperative agreements created an avenue for regulator and regulated to find common ground and work together, the sector plan allows the Environment Agency and the dairy sector to work together in setting priorities and promoting win-win initiatives.

The reasons for doing a dairy sector plan specifically, as opposed to sector plans in general, are equally practical. Environment Agency staff determined that agricultural impacts were a major source of environmental risk in the UK, especially risk of water pollution. Within the agricultural sector, statistics clearly point to dairy farming as posing higher than average risks and some unique challenges. However, the Agency recognizes that addressing the risks through command and control regulation is not a realistic option for two reasons. First, the Environment Agency does not have and never will have enough staff to closely regulate 17,000 dairy farms, because the Agency has generally put an extremely high emphasis on compliance monitoring and inspections. Second, dairy farms could easily be put out of business by tougher regulations because they have almost no hope of absorbing such costs and even less hope of passing them on to customers.

For the dairy sector plan, the Environment Agency decided to try a collaborative approach.[41] Agency policy managers initially contacted the environmental staff at the National Farmers Union (NFU) to determine their interest. NFU is one of the most politically active and sophisticated of the likely dairy stakeholders, and there was a sense that little of significance could happen unless NFU were engaged. NFU, after consulting with the Environment Agency, then recruited the Milk Development Council (MDC) as a third principal party to the sector plan. MDC's role is similar to that of the Wisconsin Milk Marketing Board – they collect levies from dairy farmers and spend the money on research, marketing, and other projects that benefit the entire sector. MDC offered to bring funding to the effort.

These three parties, the Environment Agency, NFU, and MDC agreed to begin working together on the dairy sector plan in January 2005.[42] They opted to try, as much as possible, to develop the plan as a true partnership, with joint "ownership." For the Agency, this means that the tone as well as the substance of the dairy sector plan might differ in significant ways from what it otherwise would, and is likely to differ from the other sector plans. This has proven to be a controversial point but advocates point to the importance and potential benefits of strengthening relations with dairy sector stakeholders.

[41] There has not yet been a standard approach to developing sector plans, though the Environment Agency has worked hard to promote consistency. Some of the plans have been developed collaboratively, while in other cases stakeholders have done little more than provide comments. It is far too early to compare and contrast these approaches, as none of the plans are even finalized.

[42] Additional stakeholders may eventually be recruited, but the three principals felt that they could make more progress faster by limiting the number of parties initially at the table.

The three partner organizations quickly agreed that it was unrealistic to write a meaningful environmental sector plan on the assumption that large numbers of dairy farmers would read it. Instead, they agreed that the plan would be written for the benefit of dairy sector stakeholder groups (not just the three principals). This, too, is fundamentally different from most of the other sector plans; in some cases those sectors involved so few companies that they could *all* be involved in writing and implementing the plan. The dairy sector plan will distinguish between the priorities and actions agreed to by stakeholders, and the communications tools and techniques used to influence individual dairy farmers.

Progress to date is demonstrated by two tangible work products. First, there is a complete draft of the sector plan. This draft was circulated in May 2005 to a select group of stakeholders to get their initial reaction. A revised plan reflecting input from these stakeholders will be developed and published for public comment, probably in summer or early autumn 2005. As for content, the draft dairy sector plan reflects tentative agreement among the three principals on the top priorities and strategies for environmental improvement. There has been a concerted effort to avoid mission creep and to avoid labeling everything as a "top priority." Instead, the plan offers a short list of priorities, backed up by a considerably longer list of voluntary actions intended to address those priorities. The priorities are:

- promoting ELS and Tir Cynnal (refer to Chapter 4);
- encouraging nutrient management planning;
- encouraging and facilitating investment in infrastructure;
- providing targeted compliance assistance and integrated advice; and,
- promoting the dairy sector plan.

The second tangible work product thus far produced as part of the sector plan effort is a brochure promoting ELS to dairy farmers.[43] The partners working on the sector plan see ELS as a great option for achieving multiple objectives, but Defra experts are predicting that dairy farmers will lag behind other types of farmers in choosing this option. This is because dairy farms generally had a hard time qualifying for similar schemes available in past years, and may be discouraged or misinformed. Consequently, the Environment Agency, MDC, and NFU worked very hard to produce a brochure specifically targeted to dairy farmers that explains the ELS program and how it can benefit dairy farmers. The level of cooperation among the Agency, NFU, and MDC was extraordinary, the brochure was produced in less than a month, and it was available in time for NFU's annual general meeting and for the official launch of the ELS program by Defra on March 3, 2005. This serves as a perfect example of the potential of the Dairy Sector Plan.

6.2 Pesticides Voluntary Initiative

[43] "*Entry Level Scheme: What It Can Do For Dairy Farmers*"; NFU, MDC, and Environment Agency joint publication, February 2004. Available for download from the Internet at http://www.mdc.org.uk/mdc-main/press-releases/documents/ELSLeaflet.pdf.

In 1999, the UK government announced that it believed a tax on pesticide use could be useful in reducing the environmental impacts of such chemicals.[44] The government was, however, willing to consider whether a public-private partnership could achieve the desired environmental benefits.

The proposed tax on pesticides would have cost £125 million per year, at a time when average income levels on UK farms had fallen to historically low levels. So in early 2000, the Crop Protection Association (CPA) presented for the government's consideration an alternative package of measures that was less costly. The package of measures was developed in collaboration with several other organizations representing the agriculture sector.

In response, government expressed a willingness to further explore the industry proposal and for the time being to shelve the tax proposal. Following detailed negotiations, a final agreement was signed in April 2001 by government and eight agricultural organizations. This agreement created the Voluntary Initiative (VI), a collection of dozens of specific projects to be implemented over a five year period from April 2001 through March 2006. During this period, government committed to monitoring progress and postponing any further consideration of a pesticides tax.

The VI covers the entire UK and all forms of agriculture. It is directed by an independent steering group of diverse stakeholders with representatives from farmers' unions, the crop protection industry, environmental organizations, and others. The many projects encompassed by the VI fall into three general categories: research, training, and communications & stewardship. The most important of these projects involve encouraging and enabling farmers to:

- join the National Register of Sprayer Operators, which offers continuous professional development courses;
- test their spray equipment under the National Sprayer Testing Scheme;
- complete a Crop Protection Management Plan to minimize the environmental risks associated with spraying;
- follow best practices for pesticide application and water protection, including selection of pesticides; and,
- properly dispose of unwanted pesticide products.

Farm advisors, in turn, are asked to:

- qualify for and join the BASIS Professional Register of qualified advisors (refer to Chapter 3);
- get training if needed to strengthen their knowledge of biodiversity, environmental protection, and application techniques[45];
- promote the VI and encourage farmers to participate in all the measures listed above; and,

[44] Pesticide impacts are generally less of an issue for dairy farms than they are for other types of farms, but they cannot be written off as insignificant. More to the point, the VI is presented here as an example of the potential for both voluntary agreements and collaboration among multiple organizations.

[45] An Advisors Information Network was established to provide training materials and assistance.

- follow best practices for agronomists.

The VI steering group publishes periodic milestone reports and annual progress reports. The most recent milestone report indicated that all but one project was keeping to the schedule in the work plan. The most recent annual progress report[46] also suggests that substantial progress is being made, especially on the three highlight performance indicators:

- over 14,500 farmers, collectively managing 60% of arable land in the UK, had joined the National Register of Sprayer Operators;
- over 5000 farmers, managing 40% of arable land, had tested their spray equipment under the National Sprayer Testing Scheme; and,
- 770,000 hectares of land (18% of arable land) were covered by Crop Protection Management Plans.

In addition, the VI includes a project to monitor pesticide residues in six water supply catchments. According to the annual report, measured concentrations of pesticides appear to have fallen in some but not all of these pilot catchments since the VI began. Finally, the annual report disclosed that costs of implementing the VI over the first three years had totaled £18.5 million, with around 56% of this being paid by farmers and 41% by the crop protection industry. This is just 5% of what the proposed pesticide tax might have cost over the same three years.

A March 2005 committee report in the House of Commons, however, presents a mixed review.[47] It concludes that the targets for the highlight performance indicators are not sufficiently ambitious and there is little irrefutable evidence of actual environmental improvement in the pilot catchments. At the same time, though, the report acknowledges a consensus that the VI has raised awareness and a sense of responsibility among farmers and contractors. Testimony from the Environment Agency echoes this theme, refusing to give the VI an "unalloyed endorsement" but calling it "a big success" in terms of instigating collaboration and saying it has done "a great job" in raising awareness in the farming community.

Suffice to say the VI projects will continue, and the UK government will continue to closely monitoring progress. The most recent UK budget report declared that the possibility of a tax still cannot be eliminated from consideration, and won't be unless the VI delivers the needed improvements in a reasonable timeframe. Pesticide taxes have already been instituted in Belgium, France, Denmark, Sweden, and Norway.

6.3 Assurance Schemes, Labels and Environmental Brands

This section looks at a variety of voluntary initiatives with one thing in common: the attempt to differentiate agricultural products in the marketplace based on their methods of production. Organic foods would of course be the most widely-recognized and accepted example, but organic agriculture was already addressed in Chapter 4 in

[46] "*Third Annual Report of the Voluntary Initiative Steering Group, April 2003–March 2004*"; Voluntary Initiative Steering Group, May 2004.
[47] "*Progress on the use of pesticides: the Voluntary Initiative*"; House of Commons Environment, Food and Rural Affairs Committee, HC258, April 2005.

the context of government incentives. In this chapter it remains then to look at other attempts at product differentiation. We will thus look at a sampling of assurance schemes, product labeling ideas, and product brands aimed (at least in part) at the environmentally conscious consumer.

Before beginning, we should put this subject into context. Most consumers have basic environmental values and *if prompted* express a willingness to consider those values in their purchasing decisions. However, when asked open-ended questions consumers list production methods (e.g., organic) and environmental concerns far behind price, taste, and quality as attributes that influence their food shopping decisions.[48] There is evidence that perhaps a third of the UK population are actively seeking "greener" products and are at least somewhat willing to pay more for them.[49] But we shouldn't lose sight of the fact that the opportunities for eco-labels and environmental brands are currently limited in scope. Having said all that, there *are* opportunities for farmers to target "green consumers" to the benefit of their businesses, and that is essentially the theme of this section.

6.3.1 National Dairy Farm Assured Scheme

The National Dairy Farm Assured Scheme (NDFAS) is one of nine British Farm Standards (BFS) schemes. Other schemes cover horticultural produce, chicken, beef and lamb, etc. Most large farms in the UK are involved in one of these schemes. Each scheme establishes auditable standards to which farmers can voluntarily adhere. Food products that come from farms which adhere to these standards are licensed to use the BFS "Red Tractor" logo. Consumers routinely see this logo prominently displayed on a wide range of food products, including milk and other dairy products.

The 1990 Food Safety Act imposed new due diligence requirements for food safety. In response to this legislation and growing consumer concern, supermarkets began developing a variety of farm assurance schemes. NFU became increasingly concerned with how farmers would be affected by the proliferation of confusing and at times conflicting schemes. NFU successfully negotiated with the supermarkets, who agreed to replace their own schemes with a single scheme for each sector. A new organization, Assured Food Standards (AFS), was created to oversee these BFS schemes. The program was launched in spring 2000 and for the first time products appeared on supermarket shelves bearing the Red Tractor logo.[50]

The NDFAS scheme covers milk production throughout the UK. Its members are 27 companies that purchase milk directly from more than 17,000 dairy farms.[51] These first purchasers paid AFS a fee to join the scheme and are now responsible for assuring that all of their dairy farmer clients adhere to the scheme's standards. All of the milk they sell to a dairy processor can then be sold under the Red Tractor logo. If milk from a farm not meeting the standards is mixed with assured milk, the entire

[48] See, for example, "*Food Concerns Omnibus Survey*"; COI Communications for the Food Standards Agency, 2001.
[49] "Feeding in to food policy – a submission to the Policy Commission on the Future of Food and Farming on the views of low-income consumers"; National Consumer Council, 2001.
[50] NFU retained ownership of the Red Tractor logo but licensed AFS to distribute it.
[51] This delegation is unique. In the other BFS schemes, the farmers themselves are the members.

consignment becomes non-assured and cannot be marketed with the logo by the first purchaser.

The standards which participating farmers must meet are summarized in a document published by AFS.[52] This 109-page document presents nearly 150 mandatory requirements and several additional recommended practices in these categories:

- hygiene and food safety;
- housing and facilities;
- plant and equipment;
- feedstuffs and water;
- herd health;
- stockmanship and training;
- contingency procedures; and,
- environmental measures.

A Technical Advisory Committee established the standards based on legal requirements, published Codes of Good Agricultural Practice, and industry input. Clearly, the emphasis is on animal health, animal welfare, and food safety. But NDFAS is included in this chapter because it *does* include environmental requirements *beyond statutory minimums*. For example, each farm must have a documented waste management plan. NDFAS therefore encourages voluntary environmental action by dairy farmers.

Farms are assessed for conformance to the NDFAS standards by independent certification bodies that are accredited by the UK Accreditation Service, the same organization that accredits ISO 14001 auditors. The certification bodies are independent of both NDFAS and the first purchasers, and they have complete control over the assessment process. Assessors must be trained specifically for NDFAS assessments, conduct a minimum number of assessments annually, and attend continuing professional development courses to maintain these qualifications.[53]

Each participating farm must be assessed no less frequently than once every 17 months. To be certified, they must be found in each assessment to be conforming to every mandatory requirement. If not, they are generally given up to 60 days to take corrective action and be reassessed, or they lose their "farm assured" status.

The BFS schemes have been in operation for five years and appear to be solidly established. The NDFAS Standards and Guidelines for Assessment are now in their third edition, which indicates a genuine commitment to strengthen and improve the scheme over time. For example, in this latest edition AFS responded to environmentalist critiques by adding four new environmental measures to the NDFAS standard, where previously there had been just one.

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[52] "*National Dairy Farm Assured Scheme: Standards and Guidelines for Assessment (Third Edition)*"; Assured Food Standards, October 2004.

[53] Other safeguards are in place to maintain the integrity of the process, but it would add nothing to this discussion to describe the assessment and audit process in any greater detail.

Dairy farmers are not receiving premium prices for meeting NDFAS standards and Red Tractor milk is not, as far as I can tell, sold at a premium price. Farmers have responded in large numbers to the BFS schemes, including NDFAS, primarily for market access. For some commodities membership in a BFS scheme is practically a prerequisite if the farmer hopes to sell to a major processor and gain access to supermarket shelves. For example, all the major flour millers in the UK accept only BFS wheat. The dairy market is not *quite* so closed, but fully 85% of cows' milk produced in the UK comes from NDFAS assured farms. Many dairy farmers perceive the NDFAS requirements to be just short of mandatory and no less burdensome than government regulations. There has been considerable resistance to any suggestions of adding more environmental requirements beyond the five that are in the third edition of the standards.

Finally, it is interesting to note what consumers think of the Red Tractor. A consumer survey commissioned by the NFU in May 2001, just one year after the logo was launched, found that over 30% of consumers recognized it. Though I could find no follow-up surveys, it is reasonable to expect that four years later recognition of the logo has gone up significantly. However, the 2001 survey also found that most consumers had little or no idea what the logo signifies. NFU have made concerted efforts to raise public awareness and build public confidence in the logo as a shortcut for identifying products in keeping with certain values. For example, a recent public relations campaign called "Produce with a Promise" is designed to communicate to the public that the Red Tractor stands for food grown or raised by farmers who are making specific pledges to do good things for the environment.

6.3.2 White & Wild Milk

White & Wild Milk stands out as perhaps the most obvious example in the dairy sector of a true environmental brand. It is particularly interesting from a sustainability perspective because of the way this brand allows consumers to support wildlife conservation work both on and off farms, while simultaneously helping dairy farmers get a better price for their milk and stay in business.

The brand is owned by WildCare Dairy Group Ltd, a company created by a dairy farmers' buying group in Durham. They only sell semi-skimmed milk (i.e., what Americans call 2% milk), but offer both organic and conventional varieties in one or two liter packages. White & Wild is a partnership between WildCare, the Wildlife Trusts and FWAG.[54]

The objective of White & Wild brand is to capitalize on the green consumer market to create incentives and reward dairy farmers for conserving and enhancing biodiversity. All of the farmers currently participating are in Ayrshire (Scotland). They sell their milk to WildCare, it is processed and bottled under contract by Lancashire Dairies, and ultimately sold to three of the largest supermarkets.[55]

[54] The work of FWAG was introduced in Chapter 3. The Wildlife Trusts partnership is the UK's leading conservation charity exclusively dedicated to wildlife. They are supported by over 400,000 members and care for over 2,500 nature reserves throughout the UK.
[55] Currently, the White & Wild brand is only offered at some of the locations of each supermarket.

White & Wild milk sells at a small premium, generally about 15% or 7 ppl for conventional milk. The product is thus a little more expensive than its conventional competitors, but less expensive than organic milk. White & Wild organic milk is produced by farmers who adhere to the Soil Association code of practice. This product sells at about 3 ppl more than competitors' organic milk.

The Wildlife Trusts receive a 2 ppl portion of the premium on White & Wild milk. They use these funds to support their wildlife conservation work. One of the more interesting goals of the White & Wild partnership is for participating dairy farms to serve as wildlife corridors between Wildlife Trust reserves. This goal will shape and influence decisions by the Trust about where they invest funds to improve their existing reserves and acquire more land for reserves. The money they receive from White & Wild milk also gives them funding to offer educational materials and farm visits to schools.

Participating dairy farmers receive nearly half of the premium, 3 ppl for conventional milk. This is a bonus of about 15% above what they might otherwise expect to receive. In order to sell milk under this brand, however, each participating farmer must implement a number of measures to help wildlife. The amount of the premium returned to the dairy farmer was decided after research and pilot testing to determine what it would cost farmers to participate and what level of financial incentive would be necessary.

Farmers supplying the White & Wild milk brand must participate in NDFAS. In essence, the brand builds upon NDFAS as a baseline commitment and relies upon the integrity of NDFAS to ensure that White & Wild milk meets consumer expectations for food safety, animal health and welfare, etc. But in addition, each farmer supplying White & Wild milk must also make the following environmental commitments:

- adhere to minimum environmental standards as contained in published Codes of Good Agricultural Practice;
- commission a Whole Farm Biodiversity Action Plan, to be individually prepared by FWAG;
- initiate a plan to manage at least 10% of the farm as wildlife habitat, based in part on local biodiversity action plans; and,
- implement these plans as and when premium payments permit and with help, training or advice as needed.

These conditions are continually monitored to ensure compliance and success in improving wildlife on participating farms, but this monitoring is not as rigorous or inflexible as the NDFAS assessment and audit protocols. Failure to comply will preclude a farmer from selling milk for the White & Wild brand.

6.3.3 LEAF Marque

The LEAF Marque was developed and launched in 2002 by LEAF (the organization introduced in Chapter 3 of this report). At this time it is not a brand like White & Wild Milk, but a logo like the Red Tractor. It was created in response to interest from several supermarket companies that wanted to sell premium produce that could be marketed as even more environmentally friendly than Red Tractor produce.

The LEAF Marque is similar to White & Wild Milk in that it relies on the BFS standards as a baseline prerequisite for use of the logo, and then adds additional environmental requirements beyond those in the BFS standards. In fact, verification of the LEAF Marque standards is completed as an integral part of the BFS assessment, normally extending the inspection time by a couple of hours. By taking this approach, farmers are spared the burden of extra visits and LEAF gets the benefit of all of the BFS procedures that ensure the qualifications of assessors and integrity of the process.

The LEAF Marque standards consist of more than 50 environmental requirements and dozens of recommendations, spread across the following categories:

- organization and planning;
- soil management and crop nutrition;
- crop protection;
- pollution control and waste management;
- energy efficiency;
- wildlife and landscape; and,
- animal husbandry and the environment.

Not surprisingly, these standards address many of the issues that have been raised by environmental critics of the BFS standards. LEAF intends to adjust their standards as appropriate whenever BFS standards are changed, in order to prevent duplicate or conflicting requirements. In some cases, BFS and LEAF Marque may address identical issues but LEAF will require more rigorous demonstrations of compliance with the underlying objective.

LEAF Marque products are targeted toward a high value niche market of socially conscious consumers, just as White & Wild Milk is. More than 50 product lines of fruits, vegetables, and salads bearing the LEAF Marque are sold. These products are carried at all Waitrose stores (more than 150 UK locations) and at selected stores of other retailers. The logo is not yet used on any dairy products, but LEAF is developing the LEAF Marque as a set of generic standards that will eventually cover all sectors. The standards were pilot tested on dairy farms in 2004, and several dairy farms are now adhering to those standards. The LEAF Marque does not yet appear on any milk or other dairy products because it takes time to establish a reliable supply chain from farmer to first purchaser to dairy processor. There is simply no way to label milk with the LEAF Marque until a dedicated supply chain is established for milk meeting the standards. Unfortunately this also means that it is impossible at this time to state what the price premium will be or how much of the premium will find its way back to the dairy farmer.

6.3.4 Regionally-Specific Environmental Brands and Logos

We will conclude this chapter by briefly examining an emerging trend in the UK: regionally-specific food brands and logos. More specifically, we will look only at examples where environmental characteristics have been added to the “locally produced” dimension to get even closer to the concept of sustainability.

As it turns out, all of the regionally-specific environmental brands currently in existence or likely to appear in the near term are associated with a UK National Park or a designated Area of Outstanding Natural Beauty (AONB). Great Britain's long agricultural history predates the creation of public lands by millennia. Consequently, all of the UK's national parks and AONBs include agricultural inholdings. It comes as no surprise that these places are where we find the first efforts to create regionally-specific environmental brands. Efforts are underway in the following areas:

- Peak District National Park;
- Surrey Hills AONB;
- Chilterns AONB;
- Cotswolds AONB;
- Forest of Bowland AONB;
- New Forest AONB; and,
- South Downs AONB (proposed National Park).

The details of each brand will vary. By way of illustration, we'll take a closer look at just one example that already exists: the Peak District Environmental Quality Mark (EQM).

Peak District National Park rests in central England between several of the UK's largest cities. It is said to be the 2nd most-visited national park in the world. The millions of annual visitors to the park potentially form a large niche market for products that are associated with the environmental and scenic quality of the region.

The National Park Authority launched the Peak District EQM in May 2003 with financial and technical support from both national and local governmental bodies. Their goal was to explore the benefits of making a logo (trademarked with the Patent Office) available to farms and other businesses in the Peak District National Park who meet high conservation standards.

Standards specific to farming and food were the first to be developed.[56] These standards aim to ensure that quality food is produced in a manner that goes beyond baseline production standards and statutory environmental requirements.
To qualify for the EQM, a farm or food business must observe published Codes of Good Agricultural Practice and achieve high standards of care for the environment in all aspects of management including:

- conservation of the Peak District National Park, including habitats, historic features, traditional buildings, and traditional boundaries;
- use of locally grown and produced products and services;
- use of environmentally friendly products;
- efficient use of energy and water;
- minimization of waste; and,
- provision of environmental information to staff, visitors, and the public.

[56] Standards were subsequently developed for the tourism sector, based around the English Tourism Board's Green Tourism Business Scheme.

The detailed standards for farms include requirements touching on all the following subjects:

- overgrazing and undergrazing;
- supplementary feeding;
- sites of special scientific interest;
- disposal of sheep dip;
- trimming of hedgerows; and,
- maintenance of buffer strips.

Before being awarded the Peak District EQM, a farmer must allow a detailed field survey and assessment of their farm. The results of the assessment will be used to develop a draft agreement between the National Park Authority and the farmer, including the conditions governing the use of the EQM certification mark. The agreement becomes final if it is approved by an independent Award Panel made up of representatives from The Friends of the Peak District and other organizations. The farmer is then licensed to use the Peak District EQM.

The EQM is awarded for one year and must be renewed annually. There is a follow-up visit six months after the initial award, and the National Park Authority reserves the right to visit at any time and to observe how the EQM certification mark is used by businesses. The Peak District National Park Authority is determined to actively maintain the integrity of the award for the benefit of all award holders.

The first round of assessments was undertaken in spring of 2003 and the first 21 businesses (including 12 farms) were accepted into the scheme in July 2003. Numerous other businesses have been accepted in the past two years, but as of June 2005 there are only three dairy farms approved to use the Peak District EQM. Here, as with some of the voluntary approaches described previously, we find that it is particularly hard to create incentives within the dairy sector because nearly all dairy farmers sell their milk as a commodity to a first purchaser. Whatever quality attributes might be attached to the milk or its production methods are lost when it is sold as a commodity, unless there is a dedicated supply chain for retaining the integrity of the added value.

7.0 Observations, Analysis and Recommendations

Having described in the preceding chapters a wide range of collaborative environmental policies affecting the UK dairy sector, I will now reflect upon what I have learned and what it might mean for policy development in the US and in Wisconsin. Rather than dissecting each and every policy, I will highlight some observations that strike me as being most important and relevant in the US context and analyze the lessons we can learn from these observations. I will then wrap up the chapter and this report by offering some policy recommendations for US, Wisconsin, and UK policymakers.

7.1 Observations and Analysis

I will try to bring some organization to my observations and develop a framework for analysis by posing and (hopefully) answering the fundamental questions listed below. The answers to these questions will form the basis of the recommendations presented at the end of this chapter.

- Can collaborative environmental policies for the UK dairy sector be adapted for use in the US (or more specifically, Wisconsin)?
- Which UK policy approaches appear to be most promising for addressing environmental issues and encouraging sustainable agricultural development?
- What other lessons were learned in the UK that might not be obvious?

7.1.1 Can UK policies be adapted for use in the US or Wisconsin?

In the preceding chapters I have summarized a wide range of policies that could potentially make UK dairy farming more sustainable. But the first and most fundamental question I want to address is at the "macro" level: is it reasonable to expect that any or all of these policies could be adapted for use in the US or in a state such as Wisconsin? To answer this question, I will note some of the observations I've made about the context underlying UK policies and how that compares to Wisconsin. The point here is not to assess each and every UK policy individually, but rather to look at broad social, cultural, and geographic factors. This exercise will help us determine which policy ideas hold promise for use in Wisconsin (and potentially elsewhere in the US) and which ideas probably can't be transfered at all. More importantly, it will help us understand why and how UK policy ideas need to be adapted before they could be used in Wisconsin.

There are many similarities between the Wisconsin policy context and the policy context in England and Wales – but there are also some key differences. Most of these similarities and differences were touched upon in Chapters 1 and 2. Any policy analysis must take these factors into account. England and Wales are very similar to Wisconsin in terms of:

- land area;
- average annual precipitation;
- size and composition of the dairy sector and its contribution to employment and the overall economy;
- environmental aspects and impacts from agriculture, including dairy farming;

- environmental regulatory regimes; and,
- culture and history of environmental regulatory authorities.

One other similarity is fundamentally important, but can only be appreciated by looking at some of the points listed above in combination. In both the UK and the US, it is not realistic to try to apply command and control regulations to farms in the same way we do with other industries. There are tens of thousands of sources (rather than a few thousand) spread over a huge area, and governments will never have enough employees or resources for that job.

There are many other similarities that could be mentioned, but these are the ones I consider most important for the purposes of this analysis. All of these points lend credence to the idea that some UK policies might be transferable or adaptable for use in Wisconsin.

In contrast, there are also many, many differences between these two places. The three differences that I consider most likely to affect whether UK policies can translate into an American context are:

- agricultural and environmental issues are managed by a single government Department in the UK but are managed separately in the US, Wisconsin, and most other states;
- seasonal grazing of cows is the norm in the UK, while feedlots are the norm in Wisconsin; and,
- farmland is of far greater importance to conserving biodiversity in the UK than it is in Wisconsin and most parts of the US, due to land use patterns.

None of these points can be dismissed, but none of them invalidate the premise that we can derive some good ideas from UK policies and adapt those ideas for use in the US. What is important is that we always keep these observations in mind and make policy choices that are informed by the contextual similarities and differences.

7.1.2 Which UK policy approaches appear to be most promising?

Over the course of my Atlantic Fellowship, I learned about a wide variety of policy initiatives intended to address the sustainability of agriculture. Many of these initiatives are described in the preceding chapters of this report. I also had a wonderful opportunity to observe how governments and other institutions have organized themselves and how they conduct their business to tackle this challenge.

Some of the policy approaches I observed are clearly making a positive difference. Most, however, are new enough that it is too early to say whether they are successful. So what I would like to do now is to highlight some of the approaches that seem to me to be most promising, based on my observations. I will also explain the potential benefits of adapting these approaches for use in Wisconsin and elsewhere in the US. I'll begin at the strategic level and discuss some observations about how the UK government (in particular, Defra) and the Environment Agency organize themselves and prioritize their work. After that, I'll turn to tactics used specifically to promote sustainable agriculture.

Strategic Approaches to Environmental Protection

A. Carrots and Sticks

To begin with, it must be noted that the UK government has shown a willingness to use both incentives and disincentives (carrots and sticks) as policy instruments. More to the point, they have shown a willingness to use carrots and sticks *simultaneously*. In Chapter 4 we covered a whole range of incentive programs that enable farmers to get paid for protecting and enhancing the natural environment. Conversely, Chapter 6 explained how the Pesticides Voluntary Initiative was a response by the industry to a big, scary stick: a threat by the UK government to raise taxes by £125 million. The Environment Agency also provides disincentives for poor performance via its OPRA methodology (Chapter 5).

There are lessons to be learned from this UK approach that sometimes seem lost on US policymakers. At the federal level and in most US states, the debate on environmental regulatory reform is too often framed as a choice between carrots and sticks. I believe the evidence from the UK serves as a reminder that both tools are useful, and that results are what matters. If incentive programs do not achieve the environmental improvement needed and demanded by the public, governments need to be willing and able to bring forward disincentives (taxes, regulations, etc.) Early evidence suggests the VI may be more successful and less costly than a pesticides tax – but we cannot forget that the VI would not have happened without the very real threat of a tax. A government that categorically rules out the use of disincentives (with pledges of no new taxes, for example) foolishly handicaps itself. If Wisconsin, other states, and the federal government continue to show no willingness whatsoever to regulate the environmental impacts of small farms, I shall be very surprised indeed if we see major voluntary improvements from these same farms.

B. Risk

The next big strategic approach to note is the use of risk assessment by the Environment Agency. The Agency takes a risk-based approach to almost everything they do, including budgeting, work planning, setting priorities, writing permits, conducting inspections, charging fees, and influencing legislation. Every environmental regulator uses risk assessment to one extent or another, but I've never seen it so purposefully and forcefully inserted into policy discussions as it is at the Environment Agency. The development of the Dairy Sector Plan (Chapter 6) serves as a perfect example. The plan grew out of a recognition, backed by research, solid evidence, and statistical data, that agriculture is a high-risk industry for UK water quality and that dairy farming poses the highest risks within agriculture. The whole point of the sector plan is to agree with stakeholders on priorities and adopt a work plan and communications strategy that emphasizes outcome-focused responses to real risks.

The Environment Agency approach can be contrasted with the US approach to risk assessment. In most US environmental bureaucracies and nearly all environmental advocacy organizations, risk assessment is seen as a threat. Apparently, there are many people in these organizations that fear risk assessment will be used to discredit environmental regulations. I understand that fear but think it is unfounded. In an era

of severely limited government resources, risk assessment can be and should be a potent weapon for progress. If we look at the US approach to nonpoint source water pollution, for example, we find that nearly all of our regulatory resources are being used to develop and implement regulations applicable only to the very largest farms – even though all of the evidence indicates that small unregulated farms collectively pose equal or greater environmental risk. By adopting an approach more like the Environment Agency's, US policymakers could enhance the credibility and integrity of our work and improve the chances that we meet our objectives.

C. Integration

The third strategic principle that I wish to highlight is the Environment Agency's emphasis on integrated regulation. As with the risk-based approach, integration has become a characteristic of almost all the work they do. The latest generation of environmental permits is fully integrated, meaning the permits cover releases to land, water and air, but also cover resource and energy efficiency, waste management, site restoration, and even noise. Site inspections are also integrated. Where possible, the Agency tries to address all environmental issues in a single site inspection, rather than through separate inspections for air and water, for example. We also find the integrated approach in sector plans and in the OPRA charging scheme.

Integration is an explicit part of the Environment Agency's approach to agriculture. As we saw in the discussion of IRAP in Chapter 2, they have made major commitments to building the capacity for integrated inspections of farms, for example by training staff and building an Integrated Site Database. In addition, large pig and poultry farms (but currently not dairy farms) will be required to obtain integrated permits. And finally, the Agency's organizational structure includes an Agriculture Policy Team that addresses the environmental aspects of agriculture in a truly integrated fashion. The traditional approach of segmenting these aspects and having air, water, and waste experts work independent of each other has been tossed aside.

The potential benefits of integration are far-reaching. An integrated approach is the best way to avoid sending competing or conflicting messages, avoid bureaucratic turf battles, and manage scarce public funds. It also helps employees develop more useful professional skills and makes it easier for the farmer to deal with regulatory responsibilities.

D. The Kitchen Sink Strategy

Professor Neil Gunningham from the Australian National University is one of the world's leading thinkers on environmental regulation. In the book *Smart Regulation*[57], Gunningham and co-author Professor Peter Grabosky outline a strategic approach to environmental policy that has been summed up as follows:

> "The central argument will be that, in the majority of circumstances, the use of multiple rather than single policy instruments, and a broader range of regulatory actors, will produce better regulation. Further, that this will allow

[57] "*Smart Regulation: Designing Environmental Policy*"; Gunningham and Grabosky; Oxford University Press, 1998.

> the implementation of complementary combinations of instruments and participants tailored to meet the imperatives of specific environmental issues. By implication, this means a far more imaginative, flexible, and pluralistic approach to environmental regulation than has so far been adopted in most jurisdictions."

Policy experts at the Environment Agency point to Gunningham as someone who has strongly influenced their thinking about modern regulation. This is reflected in comments made by their Chief Executive at last year's Environment 2004 conference. She explained her approach to mobilizing people to tackle big issues like climate change or sustainable agriculture: "make it clear; make it easy; throw the kitchen sink at it; get everyone involved; and, lead!"

The key principle that we should take away from this is that it is pointless, perhaps even counterproductive, to look for "silver bullets" that will make dairy farming sustainable. The strategy employed by the Environment Agency and Defra uses multiple policy instruments and multiple actors. Take nitrate pollution as an example. Direct regulations exist (SSAFO and NVZ rules) that help tackle part of the problem, in some locations. But the Agency is also working with agricultural stakeholders on a dairy sector plan that highlights nutrient management, and Defra has put several measures into the Environmental Stewardship schemes that will reduce nitrate runoff. A Nutrients Voluntary Initiative has been proposed, based on the Pesticides VI, that would engage non-governmental stakeholders in taking ownership of nitrate problems and solutions. And looming over all of this is the Water Framework Directive, which is likely to be implemented through a diverse "program of measures" that will include direct regulation and alternatives to regulation.

Without question, there can be a downside to the kitchen sink approach. "Initiative overload" is a very real concern. In order to avoid confusing and overwhelming farmers, the multiple instruments and multiple actors need to be presented in a coherent, coordinated manner with a minimum of turf battling. This requires a great deal of collaboration, and it is exactly why the Environment Agency has put so much effort into the Dairy Sector Plan. But despite these potential risks, the lesson for policymakers in the US should be very clear. We need to rethink the idea that water discharge permits are the best way or the only way to prevent nitrate runoff. And we need to get more stakeholders involved in the problem solving.

Tactics for Promoting Sustainable Agriculture

A. Merging Agriculture and Environment

Defra, as we have said, is the UK Department for Environment, Food and Rural Affairs. Defra was created in 2001 when the UK government decided to merge agricultural and environmental bureaucracies into a single organization. This move has significant implications for the drive toward sustainable agriculture. By merging agriculture and environment, the UK is one small step closer to thinking comprehensively about sustainable agriculture. The environmental element of sustainability is put in close proximity to the social and economic elements.

It is very easy to find critics of Defra, and within Defra, who say that the old boundaries have not been erased. They will say that the environmental policy experts and the agricultural policy experts don't cooperate or communicate. Based on my observations there is some truth to this, but it obscures the fact that there is *better* cooperation and *better* communication than there used to be. And as we have seen, there are numerous examples (CAP reform and the single payment system, for example) where the issues have truly begun to blend. More importantly, I saw a much more coordinated approach to agriculture and the environment in the UK than I have seen in Wisconsin or at the federal level in the US, where the bureaucracies are not only separate but sometimes at odds with each other.

Reorganizations can be devastating on employee morale and they can absorb huge amounts of resources, sometimes for little real gain. However, the potential exists for getting better policies and better results through a coordinated government approach to sustainable agriculture. In the long term, there could be savings that more than offset the costs of developing this coordinated approach.

B. Making Agriculture a Priority

The Environment Agency places a very high priority on agriculture, especially dairy farming. This is a direct result of their objective, evidence-driven, risk-based approach to regulation. The Environment Agency's Chief Executive raised issues about agriculture routinely and frequently during my tenure in the UK, at conferences, in interviews, and in internal communications. The issues receive far more attention, and at higher levels, than I believe they typically do in US regulatory bodies. Regulators in the US often speak of agricultural runoff as the greatest unregulated threat to water quality, but at the highest levels of government it is not generally treated as such.

What was even more surprising to me is the amount of attention that UK environmental advocacy organizations give to agriculture. Sustainable agriculture appears to be on a short list of top-tier issues for a wide variety of these organizations, and they put tremendous resources into related research, education, and advocacy. I can't help but contrast the UK attitudes with US attitudes. In the US, environmental groups have traditionally placed the vast majority of their resources into addressing industrial pollution or protecting natural areas and endangered species. Agriculture was until recently seen as neither industrial nor natural, and generally fell off their radar screen. I say until recently, because in the last decade US environmental groups have turned some of their attention to large, indoor animal feeding operations. But their use of the term "factory farms" is, I think, telling. US environmental advocacy groups see factories as the primary cause of environmental degradation, and are only willing to place a priority on farms that are big enough to call factories. Small farms, regardless of their potential to help or harm the environment, do not appear to be a priority in the US.

C. A Holistic View of Agriculture

Defra, the Environment Agency, and many UK environmental advocacy groups also stand apart from their US counterparts because they take a more holistic view of sustainable agriculture. When they speak of the environmental aspects of agriculture, the UK organizations will routinely talk of surface water and groundwater quality,

soil and land quality, air quality and climate change, waste management, biodiversity, landscape protection and land use, flood prevention, animal welfare, food security, and food miles. In the US it is difficult to get anyone with an interest in environmental issues to look beyond runoff and odors.

The UK emphasis on biodiversity is especially noteworthy, as it is virtually non-existent in the US. The reasons for this are partly historical. There is, for all intents and purposes, no wilderness in the UK and there are very few areas that Americans would even consider undeveloped. Across Great Britain, the land has been used for agriculture for millennia. In the UK, extensive agriculture goes hand in hand with most natural areas, and biodiversity is in no small part dependent on agricultural land. By contrast, in the US the struggle to protect biodiversity is almost always framed as an issue of protecting wilderness and undeveloped land. This is true in Wisconsin, as in most other states, even though nearly half the land of the state is farmed. By focusing almost exclusively on wilderness and undeveloped land, biodiversity advocates in effect are "writing off" nearly half the potential habitat. Furthermore, such an approach ignores the fact that farmland habitats support different species than do forests, wetlands, and other priority natural areas. Farmland birds, in particular, are in steep decline and have been described as the most threatened group of birds in North America. All of this leads me to conclude that farmland is more important to biodiversity in the UK than it is in the US, but not enough so to justify the absence of attention on this subject in US policy circles.

Most importantly, there is no need for US policymakers or environmentalists to choose between water quality issues, biodiversity issues, or other issues. They've learned in the UK that many of the best agricultural practices can be tweaked to achieve multiple benefits. As long as the focus in the US remains almost exclusively on runoff, we will optimize our policies for that one outcome instead of for multiple outcomes. A holistic approach to agriculture would help us tackle a range of priorities without piling new regulations on farmers.

D. Knowledgeable Staff

The Environment Agency makes a concerted effort to hire compliance staff and policy staff who have significant experience in the industries for which they will have responsibility. Agriculture is no exception. On the Agency's Agriculture Policy Team, for example, all but one person had experience growing up on or working on a farm. Several were still helping their families on weekends and over holidays. I had less exposure to field compliance staff, but those that I asked almost always indicated the same kinds of life experiences as the policy staff. And in addition, all of these employees are encouraged to take additional training specific to agriculture and to seek third party credentials such as those discussed in Chapter 3 of this report.

I attended meetings and conferences where I saw first hand how much of a difference this approach makes. Several times I saw Environment Agency staff making well-informed, reasoned arguments about environmental problems and solutions, without at first winning over any farmers. But when these experts were challenged on their knowledge of agricultural issues or farming practices, and had a chance to prove their qualifications, minds were changed. Farmers are often accused of being closed-minded, usually unfairly. What I saw was that they were much more open-minded

when they realized that Environment Agency staff were knowledgeable about agriculture. The Agency's policy of trying to hire people with relevant life experience seems to greatly increase the chance of getting messages across and influencing behaviors that will lead to sustainable development.

E. Collaboration

I witnessed an astonishing level of collaboration between environmental organizations and agricultural organizations in the UK. The impetus for this collaboration probably lies in some of the factors previously discussed – such as the risk-based approach, making agriculture a priority, and taking a holistic view. But regardless of how it started, it is dramatically different than the working relationships we see in Wisconsin and the US and it is fundamentally important.

It seems to me that the interests of farmers and environmentalists are converging as never before, especially in the UK. Farm families are probably the ones most affected by groundwater contamination and they are the people who benefit most from improved biodiversity on farms. Farmers could be part of the solution to climate change and may ultimately benefit financially from this crisis. There are many opportunities for environmental and agricultural organizations in the US to collaborate. Both could benefit if they would learn from the UK example, stop their finger pointing, and work together on areas of mutual interest.

F. Natural Capitalism

In their groundbreaking book *Natural Capitalism*[58], the environmental authors Paul Hawken, Amory Lovins, and Hunter Lovins begin with this concept:

> "*Natural capital* includes all the familiar resources used by humankind: water, minerals, oil, trees, fish, soil, air, et cetera. But it also encompasses living systems, which include grasslands, savannas, wetlands, estuaries, oceans, coral reefs, riparian corridors, tundras, and rainforests."

Hawken, Lovins and Lovins go on to describe an economic model that acknowledges four types of capital: human, financial, manufactured, and natural. The modern industrial form of capitalism, they claim, uses the first three types of capital to transform natural capital into consumer goods and services. In doing so, "It liquidates its capital and calls it income. It neglects to assign any value to the largest stocks of capital it employs – the natural resources and living systems…"

In a chapter dedicated to agriculture, the authors further assert: "Degradation of the natural capital that is the foundation for farming has been found to be decreasing overall farm productivity in almost all farm systems studied worldwide…" The remedy that they forcefully advocate for is to encourage sound economic investments in natural capital, i.e. the restoration of nature's ability to provide goods and services.

[58] "*Natural Capitalism: Creating the Next Industrial Revolution*"; Hawken, Lovins and Lovins; Little, Brown and Company, 1999. Also available on the Internet at http://www.natcap.org/.

The CAP reforms described in Chapter 4 can be viewed as initial steps toward a policy of investing in natural capital. I see this as a potentially profound, even revolutionary development, and the most important observation I made in the UK. The EU and therefore of course the UK have charted a new course where they will gradually get away from subsidizing production, and start paying farmers to restore natural capital. The single payment scheme ensures that farmers only qualify for government support if they maintain their land in good agricultural and environmental condition. But more to the point, governments are investing via agri-environment schemes in biodiversity enhancement, water quality improvements, and soil enrichment. While a case can still be made for eliminating government support for agriculture altogether, this is a dramatic change from past practices and a huge departure from the policies still in place in the US. The American public could benefit tremendously, especially in the long run, from emulating this transformation and explicitly attaching value to natural capital investments.

7.1.3 What other lessons were learned that might not be obvious?

Before moving on to my policy recommendations, I'd like to briefly touch upon a variety of other observations and lessons learned. None of these are, in my opinion, as fundamental to the subject at hand (collaborative environmental policies for the dairy sector) as the observations presented above, but each one can potentially inform US policy discussions in specific circumstances. Collectively, I think these observations give a more complete picture of what is interesting about UK policy and what it might mean to us in Wisconsin and the rest of the US. Because these points are not meant to be the backbone of this analysis, I'll present them here in an abbreviated form only.

- Government Confidence and Assertiveness – The UK Government and the devolved governments of Wales and Scotland operate under the assumption that government is not itself the problem. They clearly believe that government can solve problems and they strive to do so, assertively and confidently and with adequate resources. Governments in the UK appeared to me to move much faster and to take on more initiatives than their American counterparts. When a crisis occurred, such as the collapse of the car manufacturer Rover, the UK government was able to pass legislation and respond to the crisis literally in days, and more rapidly then I think would be possible in the US. I see this as a potential issue for international competitiveness. In the same way that businesses might prefer to locate in jurisdictions that efficiently deliver services, they may one day choose to locate in areas where governments can efficiently deliver policy.
- Climate Change – The differences between the UK and the US on the issue of climate change are stark. In the UK and most of Europe it is simply unthinkable to have any kind of conversation about environmental priorities without addressing climate change. In the US, the subject is either ignored or we shrug our shoulders and say nothing can be done. I was frankly shocked at how much latent hostility there is toward the US because of our national refusal to acknowledge the crisis of climate change. At conferences, meetings, and in everyday conversation this came up over and over again, and not in a friendly way.
- Local Solutions – One of the lessons I've learned from my experiences in the UK doesn't come from any specific policies or strategies or tactics examined. It's more of a subtext, a thread that is subtly woven through almost everything. With apologies for the cliché, I've come to believe that the key to sustainable dairy

farming is to think globally and act locally. Many of the thorniest environmental issues related to dairy farming can potentially be alleviated or eliminated by emphasizing the importance of support for local dairy farming and local processing capability. This support needs to come from politicians, regulators, and above all consumers. There seems to be a growing recognition in the UK, but not in the US, that sustainable agriculture must almost by definition rely heavily on local agriculture. Policies that encourage or depend too heavily upon agricultural imports (or long distance transportation of agricultural products) are policies that export environmental problems, export money from local economies, and add to climate change.

- Organic Farming Methods – Organic production is seen by many environmentalists as the gold standard for agriculture. I believe this is a misguided simplification. In my opinion, organic methods are environmentally preferable to conventional methods, all else being equal. But all else is not always equal. Good environmental management is probably as important or more important, and organic farmers have no monopoly on good management. For example, I found evidence in the UK to support the claim that organic methods are better for biodiversity, but I did not find evidence to suggest that organic farms have fewer pollution incidents. In addition, the points I've just made about the environmental benefits of local food production should be considered.
- EMS on Farms – In the UK as in the US, most efforts to encourage farmers to adopt environmental management systems have fallen on deaf ears. The tactics and messages are very similar in both places, and not surprisingly so are the results. There are too many academics and environmental consultants trying to make money or earn grants by lecturing farmers on EMS, and there are too many people trying to push software that ostensibly makes it easier to develop an EMS. I don't believe that is what farmers need. I have now studied this subject in three countries: the UK, US, and Australia. Only in Australia have I seen significant positive results. Based on what I learned in Australia, I believe farmers need one-on-one advice and assistance from people who understand both EMS and farming. And they have to be interested in EMS not just as a way to help the environment, but as a way to manage their business and keep the farm productive for future generations.
- Role of Agricultural Contractors – A study in Scotland found that more than 50% of farmers pay contractors to spread manure on their fields. In one catchment with 690 farms, there were only 8 contractors involved in this activity. In parts of Wisconsin and elsewhere in the US, contractors play a similarly significant role. The implications are obvious. Since land spreading is a potentially high-risk activity for environmental impact, it behooves us to focus much of our outreach activity on contractors. SEPA has used this strategy in Scotland and is very pleased with the results.
- Food Security – As we have learned, the CAP was created after World War II to ensure food security, i.e. a secure supply of food for the UK. Unfortunately the specific policies of the CAP were so successful that they led to overproduction, which distorts world markets and suppresses prices. The recent round of CAP reforms will go a long way to correcting this problem, but they have also exposed some attitudes in the UK government that I think should be re-examined. UK agriculture policy, in its entirety, seems to be shifting toward an unreserved embrace of globalism. Domestic production of food seems unimportant to many at the highest levels of government, as if this were an antiquated or perhaps even

quaint notion. I think this attitude is short-sighted. Continental war in Europe is currently unimaginable, but the possibility of other crises remains: for example, animal disease epidemics, bioterrorism, or energy shortages that cripple long distance food transportation networks. Food security policies should recognize the importance of sustainable domestic production without tilting toward isolationism.

- Supermarket Monopolies – In my estimation, UK policymakers made a serious mistake when they broke up the milk marketing monopolies in the early 1990s. They arguably had very sound economic reasons for doing so, but did not anticipate the problem that faces them today: an oligopoly at the other end of the supply chain. Dairy farmers are now at the mercy of a few huge supermarket chains, but this time government doesn't appear inclined to intervene. Aside from the fact that this is philosophically inconsistent and unfair to farmers, the point I wish to make is that it is a powerful force working *against* sustainable agriculture. Supermarkets are swallowing up every increase in the price consumers pay for milk, and farmers get nothing. This is driving farmers toward practices that are less sustainable.
- Free Advice for Farmers – Over the past 15 years, farmers in England have seen a steady decline in the availability of free, government-sponsored advice. Though advocates of privatization would clearly consider this to be sound fiscal policy, it nevertheless has consequences for sustainable agriculture. Farmers in England have had to pay for almost any kind of advice, including advice that might lessen their environmental impact, but most simply can't afford to pay. So instead they get free advice from people trying to sell them things (feed, fertilizer, etc). People I interviewed in Scotland and Wales felt they were much better off in terms of dairy sustainability because they had retained more comprehensive advice services. It is possible that some of Defra's advice contracts related to CAP reforms are reversing this trend, but I nevertheless raise the issue as a caution and as a policy that I think the US would be wise not to emulate.

7.2 Recommendations for US and/or State of Wisconsin

Based on my observations over a 10-month period, and months of analyzing what I've learned, I wish to offer a series of recommendations for US policymakers. Most of my recommendations will focus on actions and policies that are within the scope and authority of the Wisconsin Department of Natural Resources, my permanent employer. This is of course where my influence is most likely to result in change. To a lesser extent I will offer suggestions to other organizations, but it would be presumptuous of me (and probably pointless, ultimately) to forcefully advocate for changes in other institutions. My belief is that WDNR has a great capacity for leadership within the state and nationally, and we must lead by example. Others, if they see good results, will follow.

I have tried to distill my thoughts upon collaborative environmental policies for the dairy industry into a list of my top 10 recommendations. They are presented below in no particular order of priority.

A. Use Risk-Based Approaches Backed by Evidence

WDNR should follow the lead of the Environment Agency and make risk a more central part of how we do business. This would not necessarily require a radical

departure from our current practices, but it would require a more consistent and focused attention on risk. Perhaps the single most important step in this direction would be to systematically analyze and document risk. This means, of course, that we need some kind of methodology. The Environment Agency has several well-tested tools that should be considered. It is equally important for us to become more adept at risk communication, and demonstrating to the public that we have regulations for a reason and the reason is risk.

Water quality would be a good place to start. For example, experts at WDNR often say that runoff now poses the greatest threat to Wisconsin's waters. Can we back up that statement with evidence? Of course I believe we can, but we need to back it up in a way that is compelling to the public, to farmers, and to politicians. Furthermore, we need to document which waters are most at risk, and why. And then we need to make the commitment that WDNR will devote its resources to tackling the biggest risks, not the squeakiest wheels. This means budgeting, work planning, inspections, and policy development should all be based on risk. I'll repeat that this is not a radical departure, but it is certainly not the status quo either.

B. Attach Value to Natural Capital and Get Away from Market Interventions

US agricultural policy relies too heavily on confusing, complicated market interventions. For the time being, the US has structured most of our agricultural policies in ways that cleverly avoid punishment by the World Trade Organization, but we mostly adhere to the letter rather than the spirit of world trade rules. If globalism is a permanent trend, these policies must inevitably be revisited. The rest of the world will not forever tolerate trade-distorting subsidies in one of the richest countries in the world. The EU has already responded to similar charges, and their response – the 2003 CAP reforms – just may point the way toward a more sustainable future.

The concept of decoupling agricultural subsidies and agricultural production is revolutionary. The old market intervention policies were bad for developing nations, bad for EU farmers, and bad for the environment. The new policies support the producer instead of supporting production, and have the potential to undo much of the damage that has been one.

I have framed the shift in EU agriculture policy as a transition to policies that invest in natural capital, and it should come as no surprise that I recommend a similar shift in the US. Negotiations on the 2006 Farm Bill are an obvious place to start the debate, but they need not be the only place. I believe the Environmental Stewardship concept shows promise for Wisconsin and is not fundamentally different from other programs that already exist. It is ELS in particular, and the notion of a program that could attract 80% of all farmers, that is unusual and appealing.

My sense is that the details of ELS could not be borrowed from England and simply dropped into place in Wisconsin, but the concept could be adapted for local conditions. The English scheme puts a great emphasis on hedgerows and pasture management. Wisconsin has virtually no hedgerows and relatively few grazing operations. These are but two differences to illustrate the point; a Wisconsin program similar to ELS would have to be reinvented.

Needless to say, funding an ELS-style program in Wisconsin would be another big obstacle. It may be possible to build the ELS concept into existing or future Wisconsin-funded agricultural grant programs, without establishing a brand new program. Alternatively, non-monetary rewards could be offered. Something like ELS could potentially be included in a Green Tier charter, for example, where participation earns regulatory relief and the right to use a recognized environmental label. This option would not involve direct payments to the farmer, which certainly diminishes the appeal, but it might be possible to deliver other tangible benefits to a large number of farmers (in a watershed or in a trade association) in exchange for relatively simple environmental measures. This idea merits further development.

Ultimately, I think farmers and agricultural organizations need to take the lead on this issue. If agriculture continues to treat any change to farm policy as a threat, rather than an opportunity, the current state of US politics almost guarantees that nothing will fundamentally change. And make no mistake about it, we are talking about a fundamental change here.

Finishing on a positive note, if farmers embraced policy changes that reward them for being good stewards of the land, they could find new allies in the environmental movement. Money currently spent on rural environmental projects could potentially be invested in natural capital via a stewardship program, saving money overall and leading to win-win outcomes. But to get there, all of the stakeholders need to recognize and promote the potential for farmland to enhance natural capital (through biodiversity, groundwater recharge, landscape protection, etc.) and promote these values for their contributions to quality of life. These efforts should be focused on regions, localities, and particular habitats to be of greatest impact.

C. Continue/Strengthen Tiered Approaches to Performance and Rewards

For decades, environmental regulators in the US have emphasized the need to treat all regulated businesses fairly. The simplest way to ensure “fairness” has been to strive to treat every business equally, but the simplest way is not always the best way. Fairness has been and still is an extremely important principle, but in recent years WDNR has experimented with and advocated for tiered approaches to regulation. The tiered approach, which we have tested via Wisconsin’s Environmental Cooperation Pilot Program and Green Tier law, is an attempt to build incentives into a system that still emphasizes fairness. We have abandoned a “one size fits all” approach to fairness, and replaced it with a program that incorporates incentives for improved performance. The best-performing companies are not treated identically to the worst-performing companies, but the program is backed up by statutes that ensure fairness to all. Similar ideas have been implemented in other states and countries.

In the UK, the CAP reforms have spurred a tiered approach to environmental performance on farms. This is an exciting and extremely promising development. I believe WDNR should borrow some of the conceptual ideas of cross-compliance and environmental stewardship and marry them to our Green Tier law. By taking the best ideas from the UK, and tweaking them for American conditions, we can have an almost ready-made formula for defining superior environmental performance, the pre-requisite for Green Tier participation. What remains is to determine the incentives Wisconsin can offer at the highest tier. We unfortunately cannot use grant payments

as an incentive, as the UK has, but we can find other incentives. I strongly recommend that we pursue this opportunity.

D. Emphasize the Value of Local Food Production and Local Solutions to Environmental Problems

I have already explained the lessons I learned about the value of local food production and processing. I am utterly convinced that the key ingredient of sustainable agricultural development is an emphasis on local solutions to local problems.

I'm recommending the start of a major initiative in Wisconsin to promote the many values of local agriculture and the many ways in which to support it. This should be a coordinated effort involving WDNR, the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP), the Wisconsin Department of Commerce, agricultural trade organizations, and environmental groups.

These organizations can support local agriculture through words and deeds that actively support farm shops, local cheese brands, agri-tourism, and farmers markets. "Community supported agriculture" plans should also be promoted, along with food festivals. Restaurants should be encouraged to source local produce, meats, and dairy products. Supermarkets should be urged to create a "local" section or to clearly label local products. Throughout all, the key messages we must communicate are that people can support their community, build their community, keep dollars in their community, and minimize transportation costs and environmental impacts, etc. simply by buying local goods.

Part of WDNR's role should be to develop educational messages that teach the concept of food miles and underscore the environmental impacts of food that travels great distances before reaching the dinner table. (This could also be used as an argument to support the state's hunting and fishing programs.) We need to address the fact that the geographic origins of food are an environmental issue, with impacts on air pollution, land use, climate change, water quality and quantity, etc. WDNR should also be supportive of efforts to diversify agriculture through energy crops and other renewable energy projects. Though we must always objectively consider the potential environmental impacts of these projects, I feel we have too often lost sight of the benefits.

The Dairy Gateway initiative in northeast Wisconsin was and still could be a vehicle for a local or regional approach to sustainable agriculture. This initiative has struggled to continue and would benefit greatly from a renewed effort by multiple state agencies and a variety of outside stakeholders. The power of the Dairy Gateway vision was the way that it brought local people together to focus on local environmental and social issues, and the fact that it treated agriculture as a potential ally in that effort. A revitalized Dairy Gateway project would be the ideal place to test my recommendations for a coordinated emphasis on local sustainable agriculture.

E. Develop Sector Plans and Pilot Test the Idea of a Watershed Plan

WDNR already has sector specialists in the Bureau of Cooperative Environmental Assistance who are assigned to certain industries, and it would be a logical next step

for us to borrow the Environment Agency's idea of sector plans. A dairy sector plan would be a good first choice, but this recommendation need not be limited to dairy or even to agriculture.

Sector plans are not radically different than our normal sector work, but I think they could serve as a means to strengthen our relations with the sectors we serve, provide tangible work products, and form a strong foundation for work planning and meaningful performance measurements. I also believe it might be possible for sector plans to be used as a component of the "Grow Wisconsin" cluster development initiative.

The threat of future regulation has been a stimulus for UK sectors to work with the Environment Agency on sector plans, but not the only stimulus. In the case of the dairy sector, reducing the need for future regulation always came up as one of three or four key messages, but by no means was it the sole driver. I think sector plans could work in Wisconsin even in cases where additional regulation is not a realistic possibility anytime soon.

Though I have seen no working examples, I believe we should also explore the possibility of developing a watershed plan modeled upon the sector plan concept. Instead of setting priorities and identifying actions to address the environmental impacts of a sector, we would look at all of the industries affecting environmental quality within a watershed. This is essentially what looms ahead for the entire EU as the WFD is implemented, but there is nothing distinctly European about the idea. It can work in the US and we should try it in Wisconsin.

F. Solve Problems Using Multiple Instruments and Multiple Institutions

Policymakers in the US should be not only willing but determined to use every tool at their disposal to get environmental improvement. Throughout this report I've offered numerous examples of these tools, and earlier in this chapter I explained the advantage of the kitchen sink approach. I'll offer a few specific suggestions here, but the point is not to identify what the "right" instruments are. The point is to recommend that we employ multiple policy instruments, wielded by multiple institutions.

I sincerely believe that direct regulation is not the only way to get environmental improvement from the dairy sector. I don't even think it is the best way. But direct regulation can be and should be an important part of our environmental policy. The key is to have efficient and effective regulations based on risk. One promising idea in the offing is to integrate air pollution and water pollution regulations for large CAFOs.

I also think that policymakers cannot continue to ignore small farms. It is probably unrealistic to directly regulate small farms, but as we have seen in this report there are other options. In Chapter 3 we saw how Codes of Practice can be sanctioned by government and used as a due diligence tool. This concept can work in Wisconsin and it is an idea that should be considered by the newly created manure management task force. For example, it might be possible to craft a policy that makes adherence to best practices (e.g., no spreading of manure on icy fields) optional, but with severe

penalties imposed on anyone who causes a problem if they did not adhere to those best practices.

I also see great potential, as I've mentioned already, in the carrots and sticks approach. I've offered several examples of how we can offer incentives for improved performance by attaching value to natural capital, using Green Tier labels, etc. But it's time for Wisconsin to send a clear message to agriculture that if the incentives don't work and the problems (e.g., fish kills) don't go away, the state is willing to use burdensome or punitive measures (like taxes or strict regulations) to solve the problem. Policymakers need to understand that programs to encourage voluntary action are undermined when there is no credible threat of mandatory measures. Nowhere is this more evident than in the US failure to address climate change.

As far as other institutions go, I've already recommended that we find ways to attach value to natural capital. That is not something WDNR will do alone; it has to come from other institutions like the US Department of Agriculture. We've also seen how trade associations can be involved in a form of self-policing, as they are in the UK's Pesticides Voluntary Initiative. This idea could easily be translated to a Green Tier charter in Wisconsin. Finally, I see a role for the Wisconsin Department of Commerce in bringing economic development policy to bear on the subject of sustainable agriculture. There are no silver bullets, but through a combination of these and other measures, we can begin to tackle the challenge.

G. Integrate Efforts Within and Across Departments

I am reluctant to suggest any reorganization or attempt to merge agricultural and environmental bureaucracies in Wisconsin or anywhere else in the US. Politicians in most jurisdictions would not want any single bureaucracy to hold that much power and the bureaucracies themselves seem almost universally resistant to change. However, I think there is tremendous scope for bringing a more coordinated and integrated approach to sustainable agriculture.

Within WDNR, we must recognize that different parts of the organization have an interest in agriculture and those parts are not routinely communicating. This must be changed. I recommend the establishment of a standing team or even an informal work group that brings together different disciplines from different parts of the Department. This should include, ideally, representatives from Watershed Management, Drinking Water and Groundwater, Air Management, Cooperative Environmental Assistance, Forestry, Wildlife Management, and Endangered Resources. Whether the structure is formal or informal, and regardless of what we call it, there is a need for routine communications on agricultural issues and coordinated approaches to issues. For example, WDNR should have a unified and coordinated position on the upcoming Farm Bill.

The need for integrated efforts is just as important across Departmental lines. WDNR should try to establish regular, well-defined communications channels and protocols that would allow us to coordinate our work with the work of other parts of government that have an interest in agriculture. In addition to DATCP, this should include the Wisconsin Department of Commerce, parts of the University of Wisconsin – Extension system, and perhaps others. This kind of interagency collaboration can

only happen if priority is given to sustainable agricultural development at the highest levels of state government.

H. Continue Emphasizing Collaboration

The topic of this report is collaborative environmental policies for the dairy sector, so it should come as no surprise that I recommend a continued emphasis on collaboration. Having looked at both direct environmental regulation and the alternatives, it is clear to me that the alternatives hold more potential for promoting sustainable development, and the key to most of the alternatives is collaboration.

In Wisconsin, the amount of collaboration between government and the agricultural industries is steadily increasing. The parental modes of direct regulation are now complemented by cooperative efforts in policymaking, research, education, outreach, etc. The manure management task force which has just recently been formed is a good example. Other recent examples include the agricultural siting law and the Dairy Gateway initiative.

What is missing in this picture, I think, is collaboration between agricultural groups and environmental groups outside of government. These two sides have spent far too much time ignoring each other or pointing fingers at each other. I see a role for WDNR or another governmental body to convene these two sides and help them find common ground. Some initial work in this area has already occurred, via Dairy Gateway and Green Tier, and that's a good start, but more is needed.

I saw first hand in the UK how much common ground there is between environmental interests and agricultural interests. They need not be enemies. Potential areas of common ground include renewable energy, biodiversity protection (especially grassland birds), groundwater recharge, drinking water improvements, and land use. Not only is this common ground, it is fertile ground. There is plenty of room for environmental improvement that makes economic sense. In other words, for sustainable development. We'll know we're making progress when we see environmental groups routinely interacting with farmers as they do in the UK.

In the long term, the value of collaboration lies not just in "two heads are better than one," but also in the fact that it promotes buy-in to the solutions and it builds social cohesion. These are essential elements of sustainability. Furthermore, the collaborative approach is more likely to lead to an intrinsic form of motivation, where farmers take environmental actions because they believe it's right to do so, not because they think they have to. Similarly, environmentalists will support profitable agriculture because they believe that is right. When people are intrinsically motivated, they are better equipped to tackle future challenges and they get more and more effective at working together.

I. Adopt/Maintain a Coordinated Approach to Environmental Advice for Farmers

Wisconsin currently has a reasonably good network for farm advice but I believe it can be strengthened. I recommend serious consideration of the Welsh Farming Connect model. I envision a network made up of subject matter experts from the University of Wisconsin - Extension, DATCP, the Natural Resources Conservation

Service, WDNR, and others. The key to success is to have a single point of contact for any farmer to tap into the network, and for that contact to know who the subject matter experts are in various organizations. This kind of networking already happens informally, but could be more effective if it was done formally, "branded", and promoted. It would be even more effective if the network was sponsored by the Wisconsin Agricultural Stewardship Initiative or another organization that looks at agricultural and environmental issues on an even footing.

J. Target Outreach to Contractors

There is nothing complicated about this recommendation. WDNR should emulate the approach used by SEPA and make concerted efforts to work with agricultural contractors. Organizations like the Professional Nutrient Applicator Association of Wisconsin have indicated that they would welcome this kind of collaboration. We should also build upon past efforts to collaborate with agricultural chemical interests on pollution prevention programs.

7.3 Recommendations for the UK

Having put so much effort into determining what US policymakers can learn from our UK counterparts, it is fitting to wrap up this report by returning the favor. I want to briefly note some of the lessons I've learned in the US that may be of greatest interest to UK policymakers. I also want to examine the relevance of my conclusions to ongoing work in the UK, and conclude by *humbly* offering some recommendations to my UK hosts and other UK policymakers.

WDNR has always been a leader and an innovator among US environmental regulators. Our organization has many strengths, has learned many lessons along the way, and has much to share with others. Some of the most salient points are summarized below.

- Transparent Government – Wisconsin's government has been judged by independent parties to be the most transparent in the US. Within state government, WDNR is particularly open and responsive. We are public servants and the public are our customers. Our approach to sharing information with the public is that it is nearly always a good idea. Rather than settling for minimal compliance with Wisconsin's Open Records (freedom of information) law, WDNR strives to make it as simple and convenient as possible for the public to gain information about our activities. However difficult or inconvenient it may be to open our books to the public, we have found that it is nearly always better for the public and better for the Department than adopting a "need to know" attitude. Through this we gain their trust and having their trust makes it easier to do our jobs. I do not wish to suggest that any of our counterparts in the UK are overly secretive, but many of the comments I heard about the UK's new freedom of information law made me think this point is worth repeating. Decisions need to be made at the highest levels on whether to minimally comply with the new law or strive for full transparency.
- Stakeholder Involvement – Compared to our UK counterparts I believe we at WDNR have more experience and have been more successful at involving stakeholders in policy development. In particular, there are noticeable differences in how much of a role regulated manufacturers and other industrial businesses

have in deciding how we will interact. This can be a difficult and frustrating process, but the lesson here is that we get better regulations as a result and we get regulations that are perceived as more fair and legitimate by those who we regulate. We have learned that business stakeholders will be involved sooner or later. If we don't involve them in the development of policy, they tend to resist those policies and fight tenaciously to see that they are never implemented. Granted, I saw nothing like this in the UK, or at least not to the same extent, but the rhetoric in UK business circles and among conservative politicians seems to be tilting in that direction. The Environment Agency and other UK regulators would be wise to show responsiveness and inclusiveness now, on their own terms, rather than perhaps having it forced upon them later in ways they might not like.

- Lean Government – I must confess that I was rather jealous of the resources apparently at the disposal of Defra, the Environment Agency, and other public bodies. In Wisconsin and elsewhere in the US, we have spent most of the past decade adjusting to constantly shrinking budgets and reduced staffing levels. Yet our legal and other responsibilities have grown, if anything. In my opinion, throughout most of that period WDNR did a poor job of justifying our spending levels. Worse still, we practically refused (until very recently) to explain to the public and the politicians that cuts in funding lead to cuts in services. I believe the lesson in all of this is that government bodies, wherever they are, should make every possible effort to be lean and mean. Don't wait for budget cuts to try to cut costs, and make sure that a clear line can be drawn from expenditures to public services. I hope that government bodies in the UK are never put in the position we face here in the US, but if they are they will be much better off if they can demonstrate a history of fiscal discipline.
- Lean Government, Part Two – WDNR and many of our peer agencies in the US are stretched far too thin to do our jobs to the standards we would like. But at the same time, I can also say that we have become very adept at functioning (indeed, thriving) on extremely limited resources. One survival technique we have developed is the willingness to move ahead and take action despite uncertainty. Without question, we would love to be able to back up all our decisions with extensive, unimpeachable research and to deliver our messages with first-rate, professional communications techniques. But we can't always do that. I admired the penchant of my UK colleagues for acknowledging uncertainty and seeking to fill gaps in knowledge through research. But at times it seemed to me that they were unwilling to move forward until all the experts were convinced that all the questions had been answered. There is nothing wrong with that approach, but I offer this cautionary note. If resources ever become scarce, this organizational norm will have to be addressed. Analysis paralysis is not an option under severely limited budgets.
- Social Aspects of Sustainable Agriculture – For decades, people in Wisconsin and throughout the US have been moving out of the cities and into areas that were once rural. In most cases they move into agricultural areas, and there has been considerable tension between farmers and their new neighbors. A colleague in Wisconsin characterized this conflict as being about "competing visions of the rural ideal." The rise of large CAFOs in the US has exacerbated these problems. I believe that regulators is Wisconsin are more aware than our UK counterparts of the potentially devastating social consequences of these conflicts. At WDNR we are finding that the social element of sustainable development is perhaps under greater stress than the environmental and economic elements, and we have had to

adjust our strategies and tactics accordingly. For now, most of the UK population is still urban. But car ownership and usage is rising dramatically and with it comes the possibility of ex-migration from the cities. Second home ownership is also on the rise. The UK may one day see the kinds of conflicts that are now routine in Wisconsin, and if so I can only hope they will learn from some of our innovative approaches.

Considering all of the above, I respectfully offer the following recommendations for consideration by my esteemed colleagues in the UK:

1. **Invest the resources necessary to finish the dairy sector plan**. The Environment Agency should strive to recruit more stakeholder organizations to serve as partners in delivering the plan, and give serious consideration to allowing or even encouraging full industry "ownership" of the sector plan. I recommend more stakeholder involvement, even if it means tweaking the priorities in the sector plan in order to serve the particular needs of different organizations. The value of the increased trust that can be gained through collaboration with stakeholder groups may ultimately be greater than the value of the actions outlined in the plan. The sector plan, once completed, should be used as a communications vehicle and be part of the pilot test of new strategies for communicating with small businesses.

2. **Beware turf battles**. I heard a lot of discussion in the UK about which organization was best equipped to handle certain types of jobs. I also saw several examples of government bodies doing extremely similar, if not identical, jobs. This usually happens when organizations perceive that they can increase (or protect) their budget by taking on (or continuing) a task. Unfortunately, from the public's perspective this is often a sign that these governmental bodies either have more staff than they know what to do with, or that tax money is being wasted on duplicative services. Too often, turf battles end with budgets cut or staffing levels reduced, and everyone a loser. I strongly recommend that UK policymakers make a greater effort to coordinate their services, rather than competing. The most obvious current example I can think of is the widespread interest in catchment-level advice and the great debate over who is best equipped to offer that advice. This turf battle should be resolved through a coordinated, collaborative approach rather than a competitive one.

3. **Start thinking now about how to ensure large dairy CAFOs will be sustainable**. To date, the UK has mostly escaped the trend so evident in the US toward very large confinement dairies. It is very likely that CAFOs will never be as common in the UK as they have become in the US. But some experts, including the director of the Royal Association of British Dairy Farmers, feel that UK dairy farms will inevitably get larger and more specialized, and there may be CAFOs in their future that are larger than the average UK resident currently imagines. In my opinion, environmental regulators and advocacy groups in the US wasted a decade *resisting* this inexorable trend instead of figuring out how to make large CAFOs sustainable. We focused on a nostalgic ideal of the farm, rather than the types of farms that can survive in our modern economy. Our colleagues in the UK need not repeat that mistake. I think they would be wise to start discussing the issues and doing their research now. If they don't want CAFOs, they had better find some

clever ways to make dairy farms more competitive globally. If not, they should put some very smart people on the job to make CAFOs sustainable in a UK context. There may be lessons for them to learn from what has worked and what has failed in the US.

4. **Embrace climate change as an opportunity for farm businesses to diversify**. They've always been stewards of the land, why not the air? And who faces more risk from climate change anyway? Farms are a small part of the cause of climate change, but they could potentially be a big part of the solution. There is a tremendous amount of effort put into pointing fingers at who causes the problem, and not enough effort put into highlighting the opportunities for farmers and other business people. I think a concerted effort should be made to include carbon sequestration and on-farm renewable energy projects in future research, demonstration activity, and stewardship programs. This effort should come not just from Defra and the Environment Agency, but also from non-governmental agricultural organizations.

5. **Address the problem of supermarket power**. This is probably a case of tilting at windmills, but the issue isn't going to go away. Unfortunately I know very little about market regulation and I couldn't begin to suggest a solution. About all I can recommend is that Defra and the Environment Agency need to consistently raise the issue as an impediment to sustainable agricultural development. They should encourage supermarkets to collaborate with dairy farmers, and they should talk directly to the public whenever possible about the social and environmental ramifications of cheap milk. As a side benefit, this could help them gain trust and credibility among farmers.